

Chemical Week

EXECUTIVE
INCOME
EXECUTIVE
INCOME

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spurs Beaumont boom, bulges
acrylo capacity p. 26

'Isocracking'—new process
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Feeling impact of the
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The 'don't do it yourselves'—
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custom production. . . p. 93

October 24, 1959

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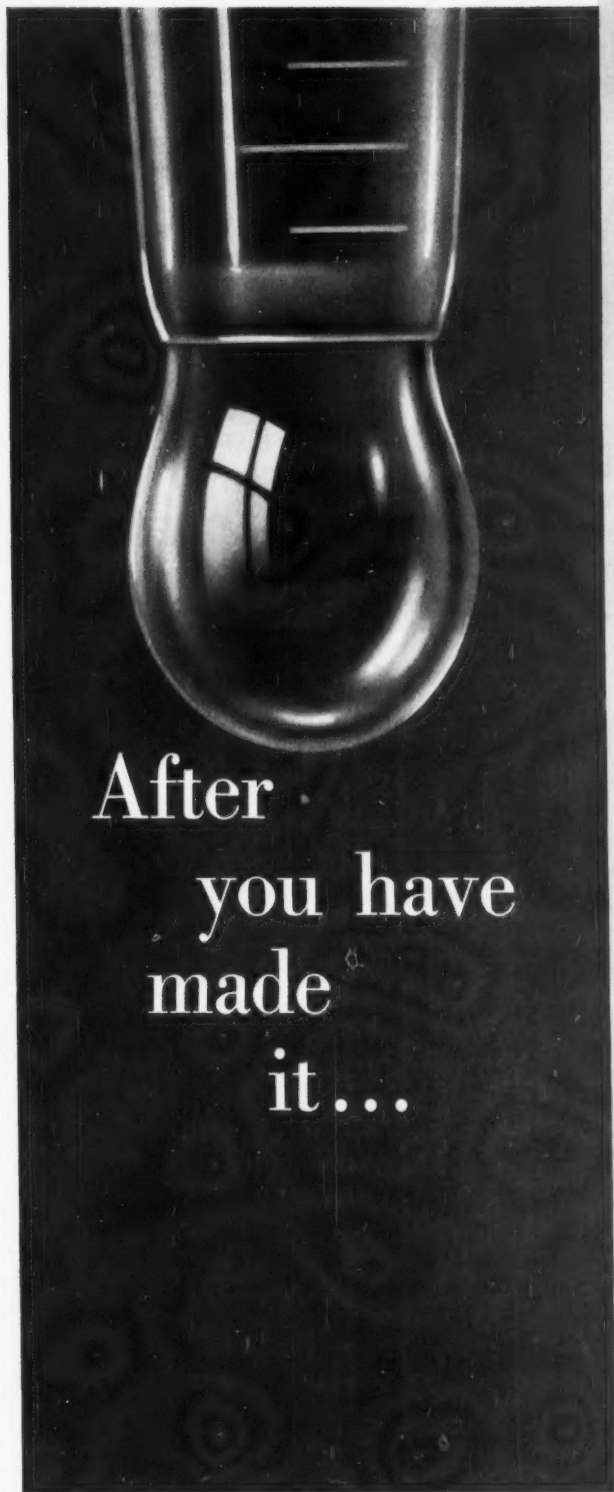
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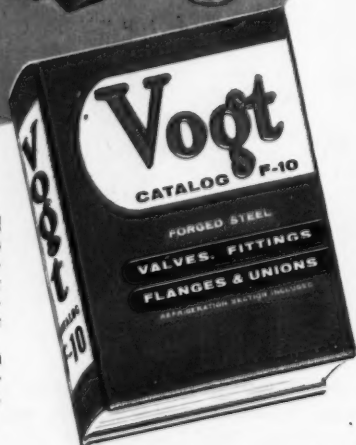
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OCTOBER 24, 1959

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- ▶ **Boom in wash-and-wear clothes sends starch makers scrambling** for innovations to stiffen wilting businessp. 49
- ▶ **Foodstores carry automotive specialties?** Some chains are trying it. Impact on TBA selling could be greatp. 58
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- 28 Trial of five polio vaccine producers on price-fixing charges opens in Trenton.
- 29 McGraw-Hill's latest industrial census pegs geographic distribution of CPI's construction.
- 30 Here's the new testimony at Federal Trade Commission's hearings on antibiotic collusion.
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Aerosols, one-shot packages, anti-body-odor additives — gimmicks starch makers are using to vitalize sagging sales.
- 58 Opening of gasoline stations by food chains may provide big new outlet for automotive specialties.
- 63 ADMINISTRATION
Compensation of chemical company chief executives dropped in '58, largely due to industry's recession-clipped sales.

- 64 Monsanto buys Nitro, W. Va., realty company to find 700 acres of industrial, residential land.

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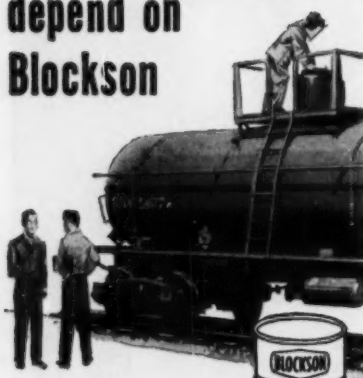


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THE BUSINESS MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

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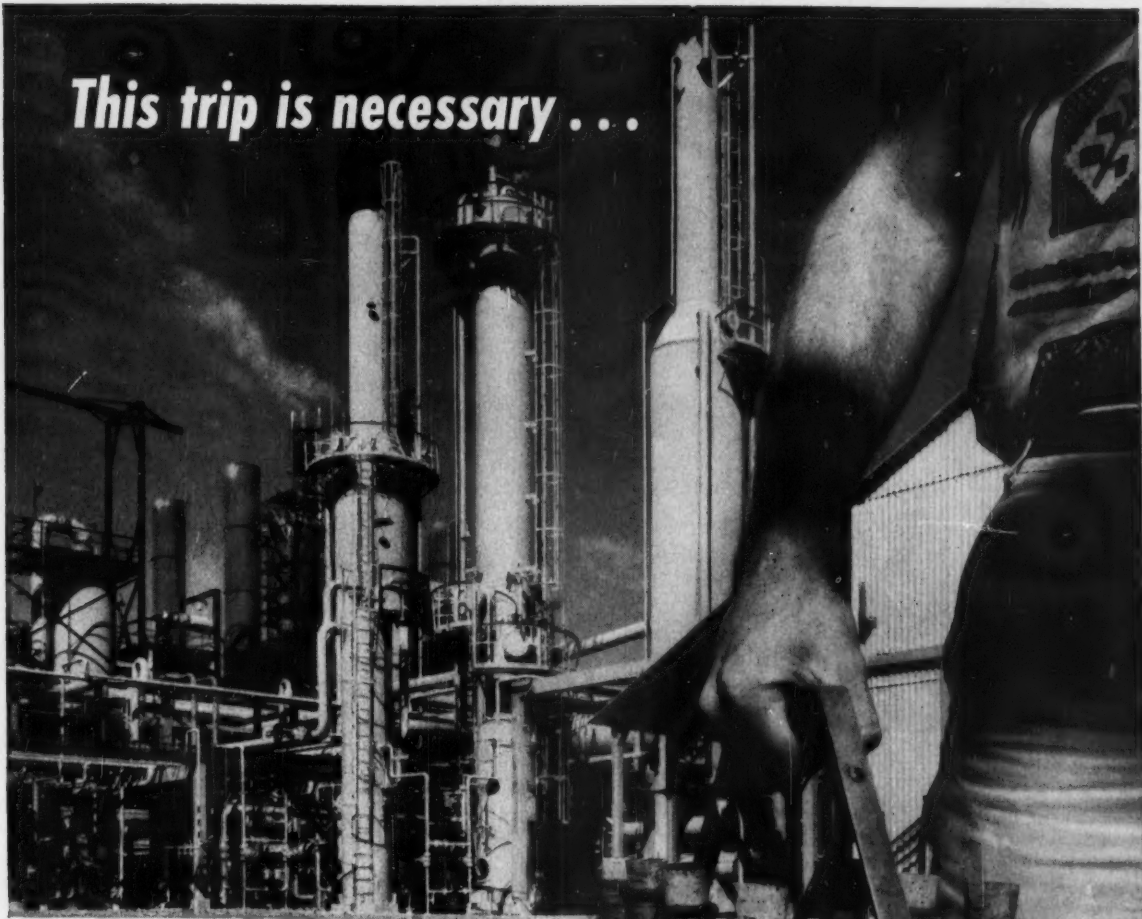


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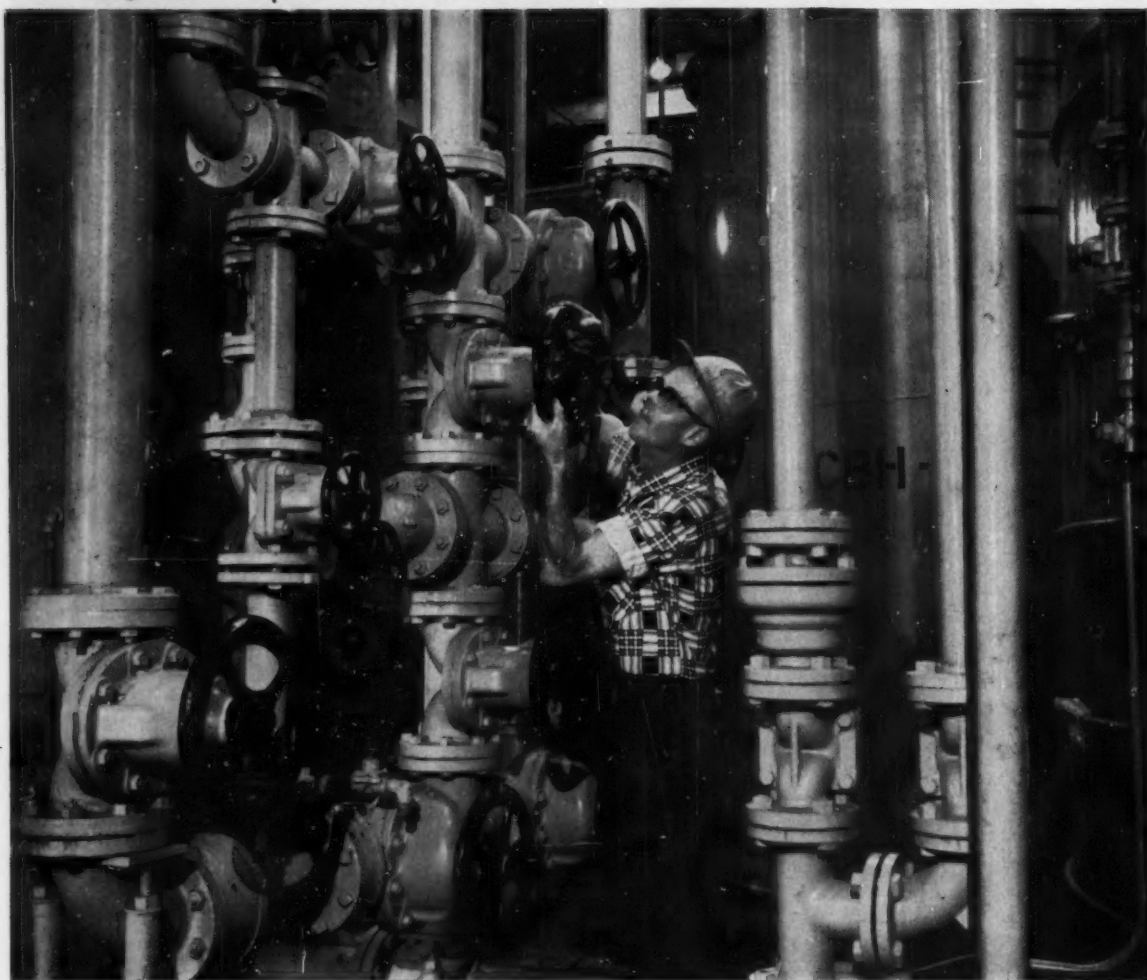
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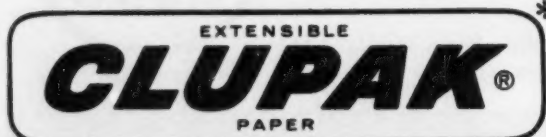


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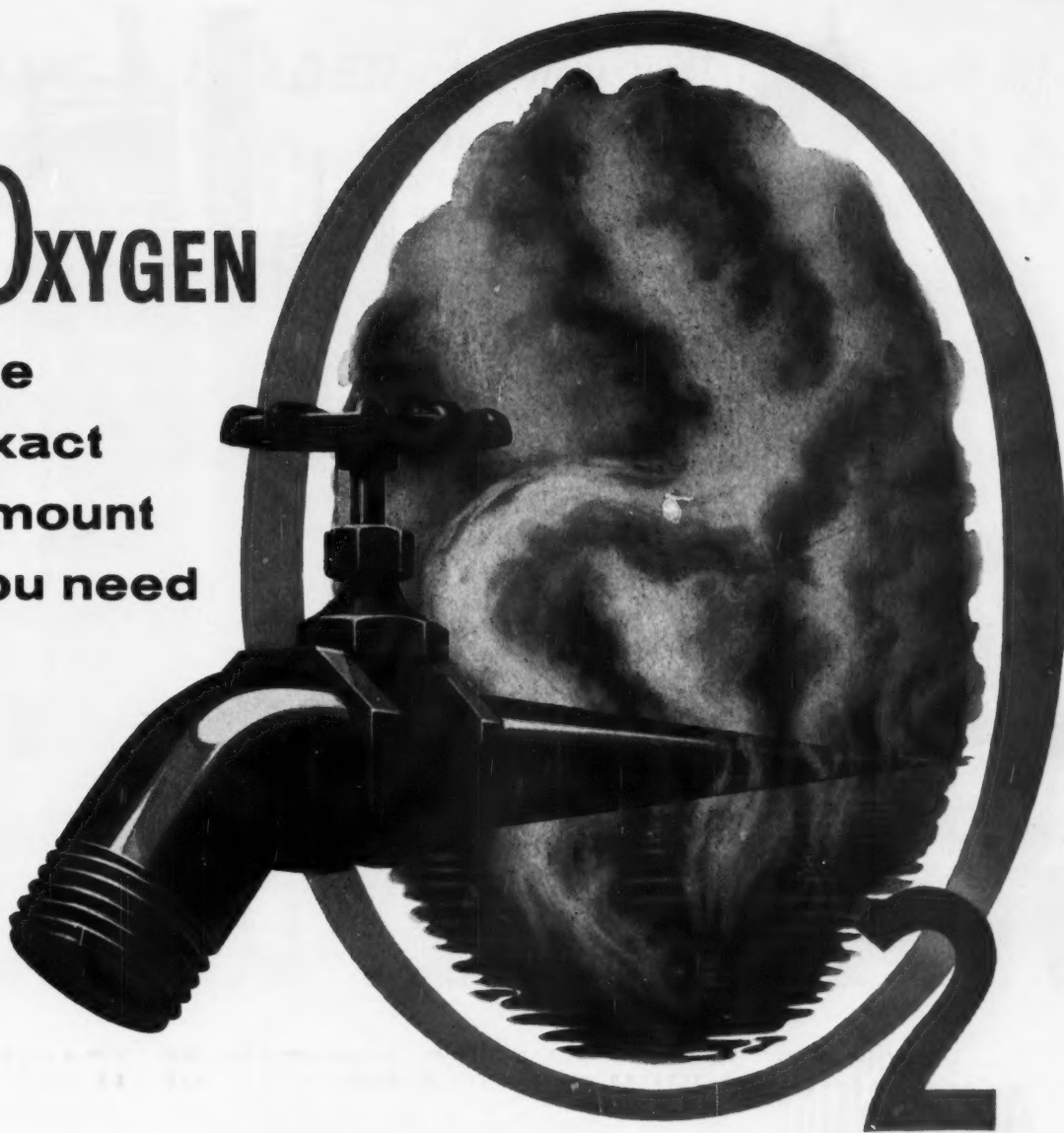
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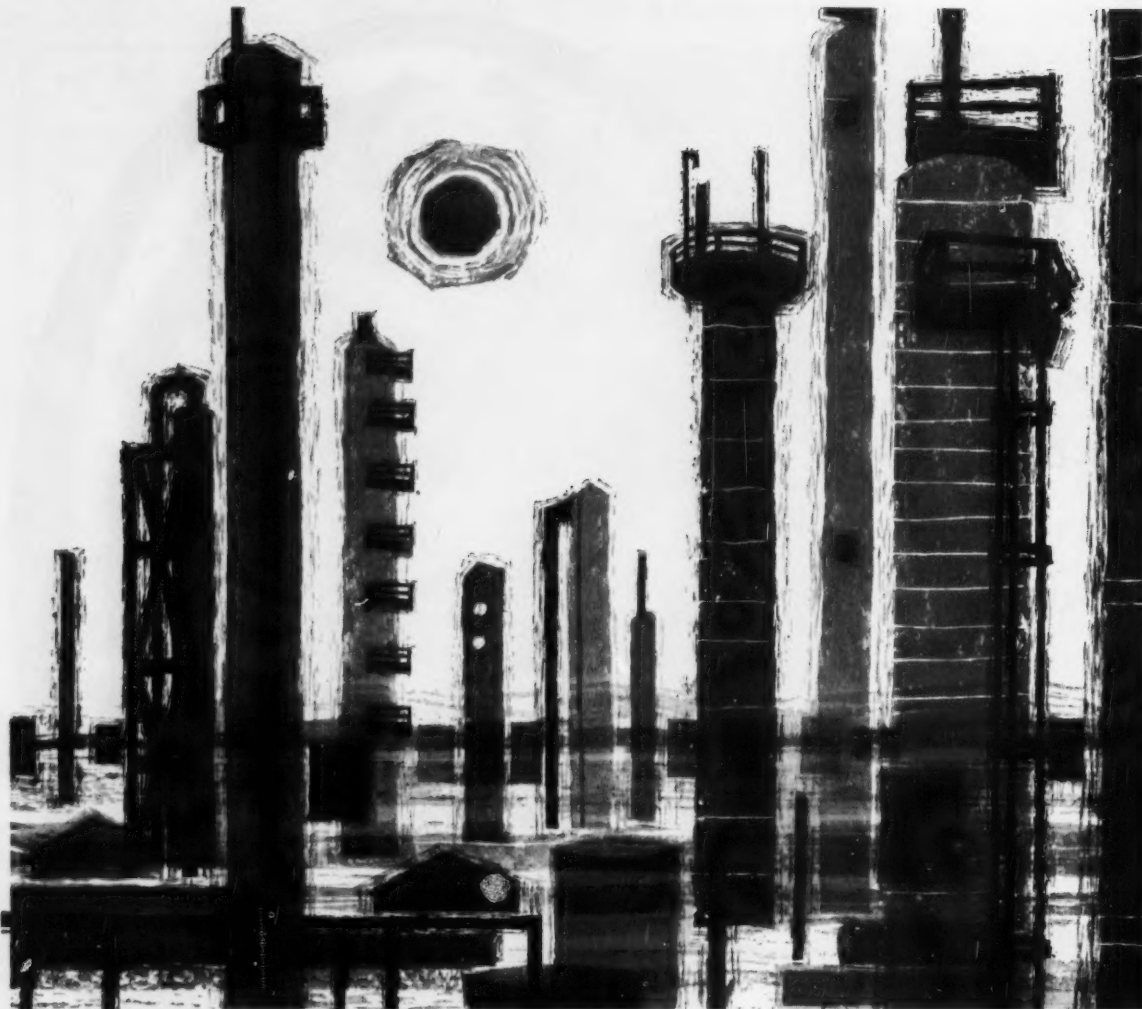
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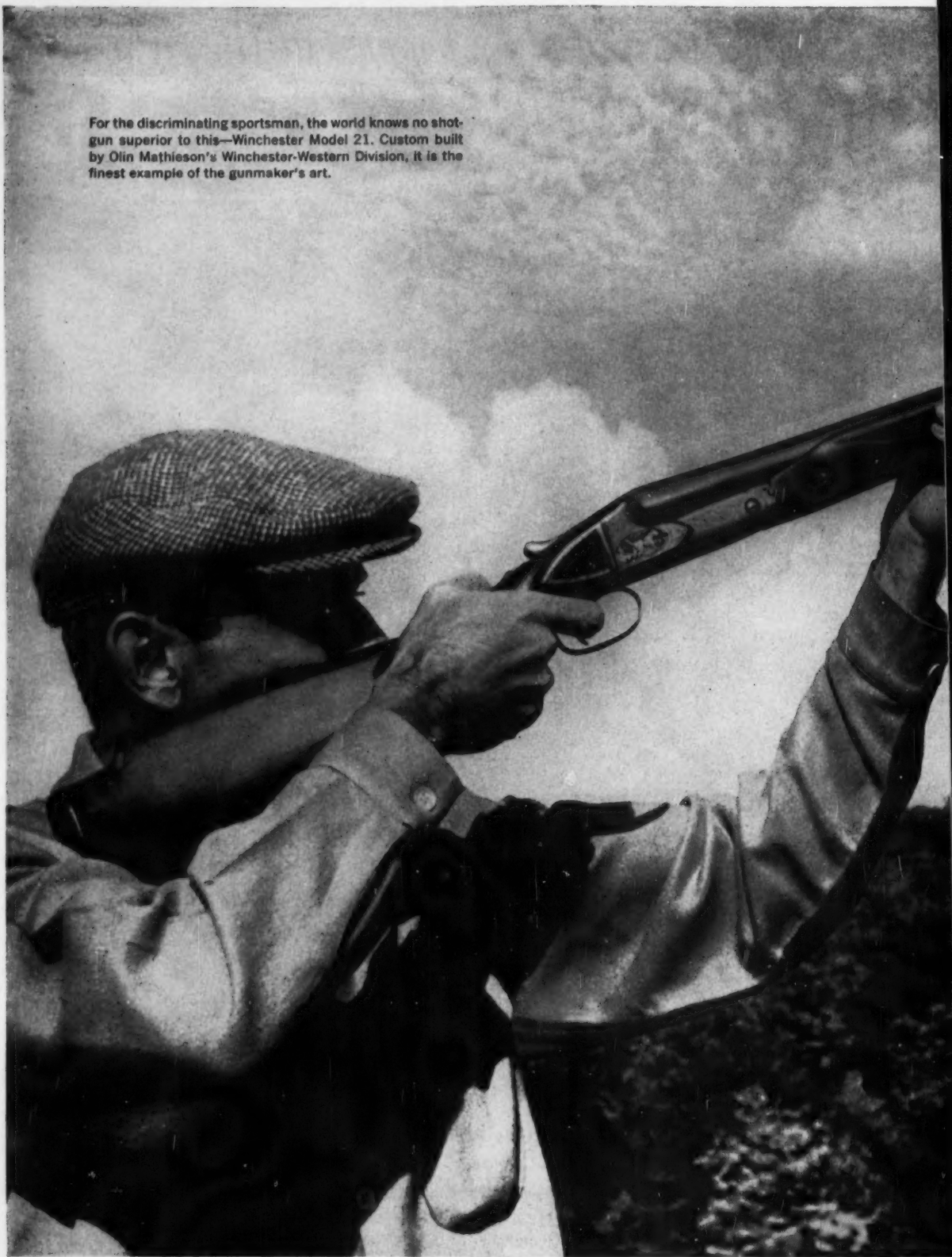


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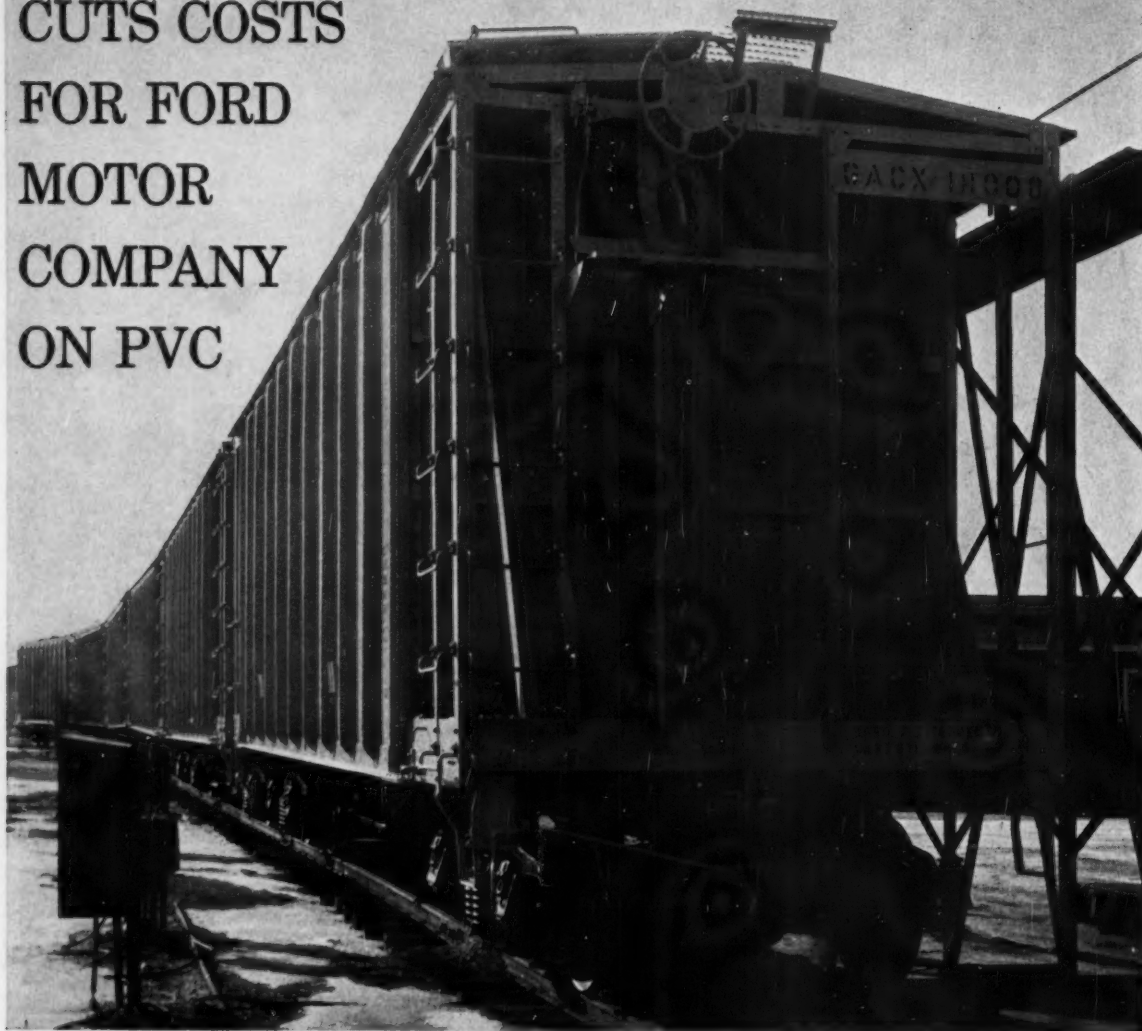


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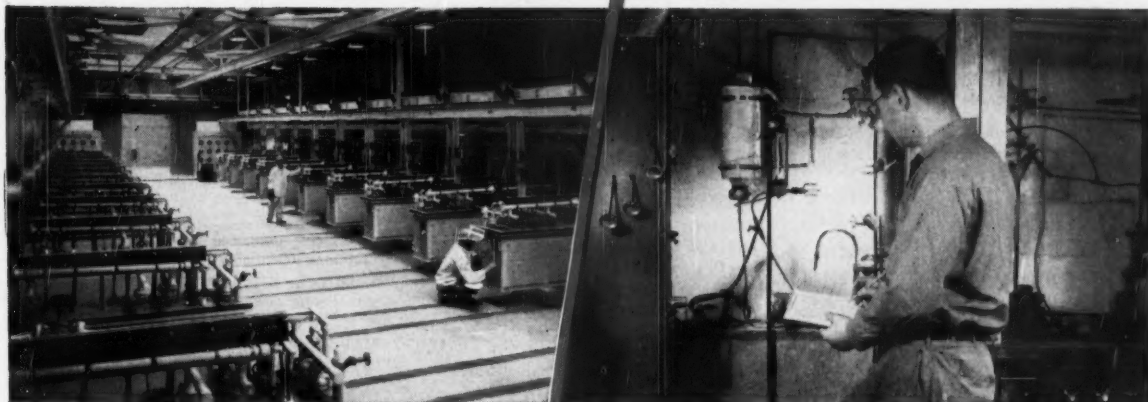
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Business Newsletter

CHEMICAL WEEK
October 24, 1959

There's a crest of optimism in the week's earnings figures, as income and sales reports run far ahead of '58. And with steel production likely to jump to near-capacity for 80 days if the government gets the injunction it's seeking in U.S. district court at Pittsburgh this week, the outlook is for hefty CPI sales in the fourth quarter as well.

- Du Pont's nine-month sales and earnings are highest ever; but—probably reflecting the steel strike—third quarter results were not quite up to the three-month records established in the preceding quarter. Nine-month sales of \$1.6 billion were up 22% from '58 and up 8% from '57 levels; operating income per common share was \$5, up 41% from '58 and up 10% from '57.

- Monsanto boosted nine-month sales 15.5%, to \$465.9 million, and raised earnings 72%, to \$36 million (parent company plus U.S. and Canadian subsidiaries). But like Du Pont, Monsanto posted slight decreases in third-quarter results, compared with second-quarter figures.

- Dow Chemical Co., for its fiscal year's first quarter, ended Aug. 31, reports a 99% gain in net income; \$22.3 million, compared with \$11.2 million in the like quarter of '58. Sales for the period were up 22%, to \$191.7 million, from \$152.2 million.

- Allied Chemical Corp., for the nine months ending Sept. 30, reports a 70% increase in net income—\$75.7 million, compared with \$38.5 million in '58. Sales were up 15%, to \$546.6 million from the year-ago figure of \$473.7 million. The sales total was nearly 5% higher than Allied's previous nine months' peak, attained in '57; and the earnings also top the '57 record if nonrecurring profits are excluded.

- Hercules Powder Co.'s preliminary earnings statement indicates its sales for the nine months' period were \$210.2 million; 19% higher than sales of \$177.4 million in the corresponding '58 period.

Other sales and earnings statements:

Interchemical Corp. says it expects its net earnings to approximate \$4.8 million for the nine months ended Sept. 30, 60% up from the \$3-million figure of the same period last year. Sales rose 14%, to \$92.8 million, from '58's \$81.1 million.

Pierce and Stevens Chemical Corp. says its gross sales for the nine-month period were up 10%, net income up 20-25%, while U.S. Vitamin and Pharmaceutical Corp. reports little change in either sales or earnings; consolidated nine-month sales are \$10.5 million vs. '58's \$10.3 million. Net income was \$1.3 million, compared with \$1.25 million in the like '58 period.

Business

Newsletter

(Continued)

Colgate-Palmolive Co. reports sales of \$440.5 million, 9.2% above the \$403.5 total for the nine-month period last year. Net income rose 22%, to \$18.1 million, from \$14.8 million.

Highlights from other companies' nine-month statements: Heyden Newport's sales were up 16%, to \$42 million; net income bounded 79%, to \$2.1 million. Texas Gulf Sulphur lifted sales 20.6%, to \$48.6 million, but earnings slipped 3.5%, to \$97 million. Upjohn's sales were up 7.8%, to \$117.9 million, and earnings rose 9.5%, to \$18.4 million.

•
A managerial tightening-up is under way at Dow's Texas Division. Precepts for running a tauter ship—informally labeled "10 commandments"—have been adopted as drawn up by a divisional management committee. They may be a prelude to broad changes in practice.

•
Another maleic anhydride plant is on the way. Pittsburgh Coke & Chemical Co. says its board has given a go-ahead signal for construction of a 20-million lbs./year unit at the company's main plant (Neville Island, Pa.). Due for completion: early '61.

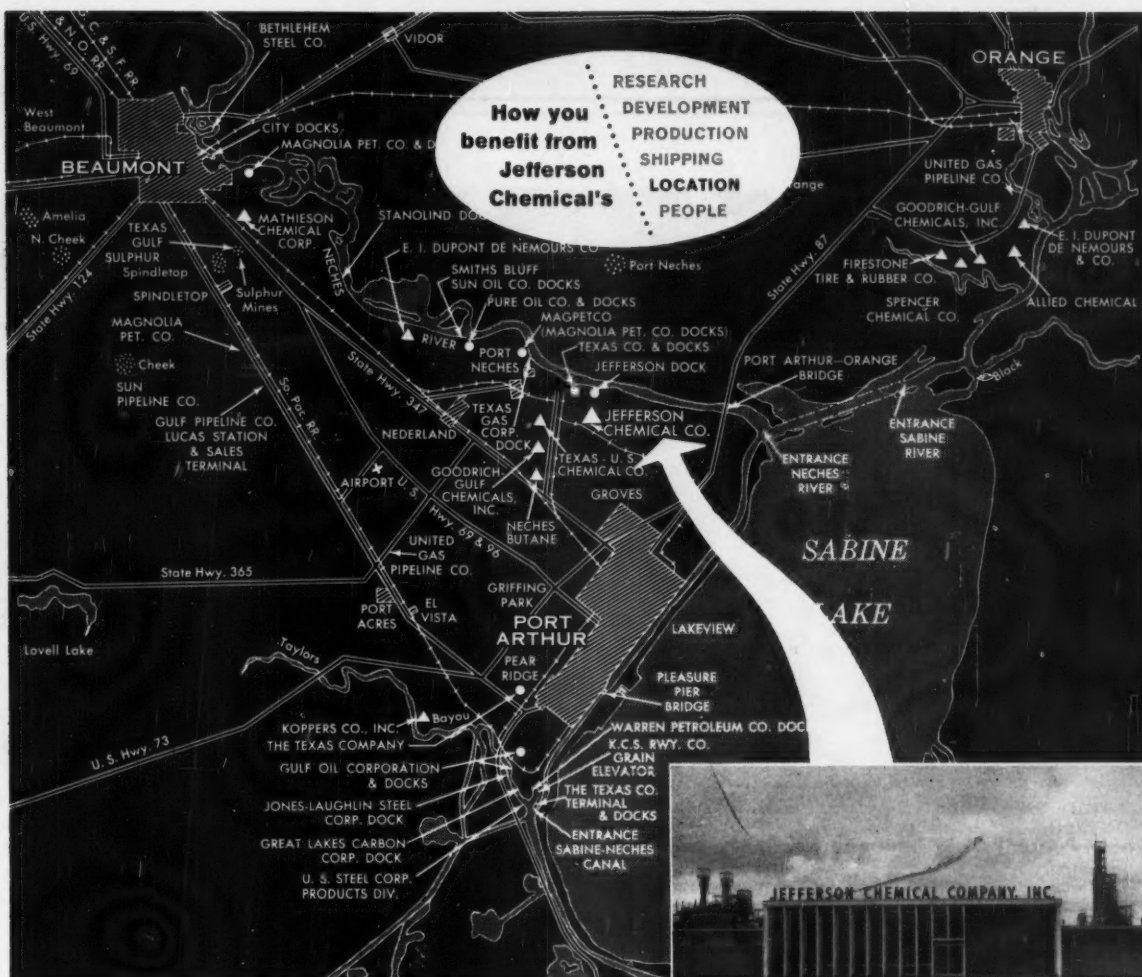
Right now, maleic anhydride is said to be in tight supply (*CW Market Newsletter*, Aug. 8). Capacity production at American Cynamid's expanding plant at nearby Bridgeville, Pa., will be the first step toward abundance—and possible overcapacity. The result: softening prices foreseen, possibly as early as '60.

•
And Monsanto is doubling capacity of its bisphenol-A facility at St. Louis—the second expansion there in as many years. Only last week, Union Carbide revealed its plans to build a bisphenol-A plant at Marietta, O. (*CW Business Newsletter*, Oct. 17). Capacity was not revealed.

•
Montecatini's new U.S. company, Novamont Corp., is still clearing trees from its Neal, W. Va., polypropylene plant site; but now says the plant has been redesigned for a capacity of 25 million lbs./year. Originally planned: 11 million lbs./year.

•
The CPI's growing stakes overseas are highlighted by two upcoming meetings. At the Manufacturing Chemists' Assn.'s ninth semiannual meeting in New York Nov. 24, international operations will be the subject of one of the six panel discussions. The others: industrial relations, marketing, industry-government relations, science teaching, and the construction industry as a plastics market.

And next week in El Salvador (San Salvador), U.S. chemical men will take part in a meeting of manufacturers, bankers and traders, called to discuss the workings of the new Central American "Common Market."



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Socony Mobil's big Beaumont refinery provides raw-materials base for area's chemical boom hopes.

Acrylonitrile Bows into Beaumont

Du Pont last week took another step toward making itself independent of outside acrylonitrile sources, revealed plans for an ammonia-propylene-process acrylonitrile plant at Beaumont, Tex. The news won't draw cheers from acrylonitrile producers, already struggling against overcapacity; but it's good news indeed for local boosters booming the Beaumont area as a chemical center.

Du Pont—which already selected Beaumont for a new caprolactam plant—consumes about 100 million lbs./year of acrylonitrile (for its Orlon acrylic fiber). U.S. '59 acrylonitrile capacity is set at about 330 million lbs.; but it's anticipated that less than 200 million lbs. will be consumed this year. About 70% will go for fibers.

More Captive: It's also Du Pont's second move into acrylonitrile production. Under construction right now at Memphis, Tenn., is a unit with a probable capacity of at least 30 million lbs./year—also for fiber. The Memphis plant will utilize the acetyl-

ene-plus-hydrogen cyanide process (*CW*, June 27, p. 25) researched by Du Pont's Electrochemicals Dept.

American Cyanamid, Monsanto, Union Carbide and B. F. Goodrich are today's major acrylonitrile producers. The first three produce fibers, which account for but a small fraction of their respective acrylonitrile for nitrile rubbers; it is piloting a dinitrile fiber, Darvan.

Add Another: Impact of the two Du Pont ventures within five months is heightened by Sohio's upcoming entry into acrylo manufacture at Lima, O., via its own ammonia-propylene route. Market observers are wondering how Sohio will find outlets in the face of growing acrylonitrile overcapacity.

It's worth noting—although confirmation is not forthcoming—that the Sohio process reportedly could turn out acrylo for well under the current 27¢/lb. (tanks) tag.

Some still believe that Dow's

Zefran acrylic fiber will be sole user of Sohio's acrylonitrile—Dow shelved its own acrylonitrile plans. Du Pont may be another customer. For, even with its Memphis and Beaumont plants, Du Pont will need additional sources—especially in view of the synthetic fiber consumption spurt predicted for the coming decade.

Propylene Source? Socony Mobil's projected ethylene-propylene-butadiene complex also at Beaumont is a logical bet to supply the new Du Pont plant's propylene.

Some sources hold that Mobil will run a propylene pipeline right into the Du Pont plant. Neither company will comment. (Mobil also is a competitor for the contract to supply high-purity ethylene for Du Pont's expanded polyethylene plant at nearby Orange, Tex.)

Beaumont's Future: The Du Pont move has sparked a blaze of speculation on future CPI activity in the Beaumont-Orange-Port Arthur area.

Among Beaumont's inducements:

(1) Large crude oil, natural gas, sulfur and salt resources.

(2) About 50 crude and product pipelines.

(3) Deep inland water (Neches River). The Port of Navigation district of Jefferson County is enlarging what is already the biggest general-cargo port in the area. It owns 400 acres of possible industrial sites.

(4) Rapid growth of the Gulf State Utility Corp. Recently completed: an 11,000-kw. unit, bringing total station capacity to 487,000 kw. A \$194-million expansion is under way.

(5) Ample water and steam generating resources. The latest federal public works bill provides for building the McGee Bend Dam 70 miles north of Beaumont. It will retain more than 400 million acre ft. of water.

And Petrochemicals: Perhaps most important is the handy availability of petrochemical raw materials—e.g., ethylene and propylene. Nearby are Petroleum Chemicals, Inc. (Lake Charles, La.); refineries of Gulf and Texaco (Port Arthur, Tex.); Jefferson Chemical Co.; and the Mobil complex still under construction. Mobil's \$25-million ethylene plant is said to be the world's largest. Capacity: 380 million lbs./year.

Unofficially, this is said to represent only about one-fourth of the total money Mobil expects to spend in the area on petrochemicals. And local sources state that visible from the air are two units under construction at the refinery, about which Mobil has made no public statements.

However, Mobil has stated that when demand is sufficient it would begin extracting commercial quantities of benzene, xylene, toluene and dicyclic aromatics. And Gulf already has a 30-million-gal./year benzene plant.

Growth Signs: Neches Butane Products Co. has just completed a 300,000-tons/year plant. Cost: \$20 million. One third of this plant is now idle, and Neches Butane is among the ranks of those companies seeking new customers. Neches Butane supplies both parent companies — Goodrich-Gulf and Texas-U.S. Chemical Co.

A significant step for Texas-U.S.

may be the recent shift of its president, A. K. O'Keefe, and its manager of commercial planning, to Port Neches.

And Texas Gulf Sulphur is in the midst of a \$3-million expansion at its molten and bulk sulfur terminal on the Neches River near Spindletop salt dome.

Olin Mathieson last year completed expansion of sulfuric acid production to about 500 tons/day and also produces an ammonium sulfate fertilizer for nearby rice fields.

Long-Awaited Move: Under speculation in Beaumont is the next move of Goodrich-Gulf. Within a few weeks, the company is expected to make its long-awaited move into commercial polyethylene. For some time, the firm has been pilot planting, as well as importing, polyethylene for evaluation and market testing. Chances are it will put up a "polyolefins," rather than a polyethylene, plant. At any rate, the Goodrich-Gulf installation will tie in with the Beaumont-Orange-Port Arthur development, since Gulf Oil (Port Arthur) will supply Goodrich-Gulf with the needed olefin raw materials.

The following companies are involved in possibilities being bruited about the industry:

- **Phillips Chemical**—For about three years, the company has been looking for a carbon black plant site. Speculation centers on a 50-acre piece near Orange, but the company won't discuss location or starting date of such a plant.

- **American Cyanamid**—It has about 1,000 acres in the area, but no special plans outlined at present.

- **Hercules Powder**—A Gulf site is under consideration for its second polypropylene plant, with Mobil as the possible supplier.

And there's rife, but unconfirmed, speculation that Chatham Chemical Co. (New York) has been considering putting up an ethylene glycol plant in the Southwest. Hints pinpoint Beaumont for this venture.

Local confidence in the whole area is at a new high—with Beaumont envisioned as a key chemical center of the future.

TOP CPI STATES

State	Employees	Plants
1. Ohio	773,891	2,076
2. Pa.	654,368	1,857
3. New York	643,007	1,891
4. New Jersey	536,119	1,828
5. Illinois	460,283	1,999
6. California	438,800	1,937
7. Texas	372,794	1,150
8. Indiana	314,708	627
9. Michigan	300,124	996
10. Mass.	273,645	1,044
11. Tennessee	240,348	511
12. Maryland	199,243	414
13. Wisconsin	181,510	620

CPI Pinpointed

A new perspective on the scope of the CPI emerged this week with the completion of McGraw-Hill's census of manufacturers—the first since '54. It shows 25,452 plants in the U.S. primarily engaged in chemical processing. They employ about 7.7 million—47% of total U.S. manufacturing employment.

And a total of 4,211 plants, employing 1.9 million, manufacture chemically processed materials as secondary products.

Top CPI region is the East North Central states — Illinois, Indiana, Michigan, Ohio and Wisconsin. They have 6,318 primary CPI plants, which employ about 2 million—26.3% of total CPI employment in the U.S.

Second-largest CPI region is the Middle Atlantic group—New Jersey, New York and Pennsylvania. They include 5,576 plants, employ 1.8 million, or 23.8% of the U.S. total.

Ohio claims the largest CPI concentration in the U.S., with 2,076 plants, 773,891 employees. Next, by employees, comes Pennsylvania, with 654,368 in 1,857 plants. By number of plants, Illinois ranks second (with 1,999), though it is only the fifth-largest employer.

Within the CPI, the chemicals and petrochemicals group is the largest, with 2,431 plants, 773,773 employees. Other groups: drugs and medicines, 1,158 plants, 345,989 employees; fertilizers and agricultural chemicals, 831 plants, 115,394 employees; man-made fibers, 97 plants, 123,755 employees.



DRAWINGS BY RICHARD P. KLUGA

Parke, Davis counsel Gerhard Gesell tells jury he's 'rankly annoyed' with the government's pricing data.

Vaccine Makers Face the Jury

Another shock wave hit the besieged pharmaceutical industry last week as the trial of five Salk vaccine producers opened in the federal court in Trenton, N.J.

The defendants—Eli Lilly, Allied Laboratories, American Home Products, Merck, and Parke, Davis—were criminally indicted by a grand jury in May '58. The Justice Dept. charges that they violated the Sherman Act by conspiring to fix prices and eliminate competition on sales of Salk vaccine to federal, state and local governments.

For the pharmaceutical industry, a verdict of guilty would cost more than the maximum fines of \$100,000 faced by each defendant, more than the millions of dollars in civil damage suits that would likely follow.

With the industry already under federal fire in FTC hearings on antibiotic pricing (*see p. 30*), under attack from various consumer groups and publications, and facing another Senate antitrust probe next month, a guilty verdict would be a major public relations blow. Behind it all: the specter of controlling legislation.

Key Roles: The key figures in the courtroom scene emphasize the trial's significance. On the bench is Judge Phillip Foreman, known as a "nonsense" judge, who has presided over U.S. district courts for 26 years.

Facing Judge Foreman and the jury (eight "white collar" workers, five "blue collar" workers, and a housewife*) and dividing the courtroom is an inner circle of lawyers—the three-man government squad headed by Lewis Bernstein, chief of the Justice Dept.'s special litigation section; and a battery of 19 defendants' attorneys. The latter group includes former New York Gov. Thomas E. Dewey, representing Lilly; and Parke, Davis counsel Gerhard Gesell, who led the successful defense in the Du Pont cellophane monopoly suit.

Brisk Start: The trial got off to a fast start on Monday. First up was Bernstein, who took only 50 minutes to line out a summary of the indictment and the history of Salk vaccine production.

The evidence will show, Bernstein told the jury in his 50-minute opening

* The jury includes two alternates.

statement, that vaccine prices were "substantially the same"—sometimes down to the fourth decimal place—in sales to at least 32 public authorities throughout the U.S. This uniformity, he charged, "did not result from coincidence, but from an understanding . . . a conspiracy."

Although Lilly did not make a public price announcement until March '55 (vaccine sales got government clearance several weeks later), Bernstein asserted, the industry knew of its prices before that date.

The government's 33 witnesses, he said, will include a Long Island drug wholesaler who was allegedly threatened by Allied's Pitman-Moore subsidiary with a cutoff of his vaccine supply, when he underbid 10 other wholesalers for the Milwaukee contract. Slated to be another government witness is a Lilly distributor, who allegedly was told to correct a low bid he submitted for a contract.

Common Knowledge: The defense pattern quickly emerged from the opening statements by the company's lawyers. The prices were the same, three of them acknowledged, but not

because there was a conspiracy; competitors' prices were common knowledge and it was nothing more than good business to meet them.

To explain how other producers could have known Lilly's prices before they were publicly announced in March '55, Dewey told the jury that "at least 50 people" within Lilly knew the prices in the summer of '54, so the information could have leaked out.

Dewey's contention was backed up by Gesell, who asserted that the government was "confused" on the issue, that as early as Dec. '54, Lilly salesmen had "jumped the gun" and revealed the prices to mutual customers.

One reply to Bernstein's criticisms on pricing came from Roy McDonald, counsel for American Home Products' subsidiary, Wyeth Labs. With Dewey, he noted that the government had, in effect, put a floor under prices. The U.S. Dept. of Health, Education & Welfare had entered into an agreement with the companies that they would not charge the agency more than they charged any other health agency. (H-E-W purchases first stirred Congressional interest in polio vaccine pricing in '56.)

"There was an overwhelming demand for every cc. of vaccine," McDonald told the jury. "What reason was there to give quantity discounts?"

Gesell asserted that the vaccine prices were not always uniform, that they were always going down, and that there was a lag between companies' price cuts. Parke, Davis' price dropped six times between Feb. '56 and March '58, he said. He was "frankly annoyed," he told the jury, that the government chose the "convenient cutoff date" of evidence at Dec. 31, '57, because the vaccine prices began to fall after that date.

Merck's attorney, Jerome Shapiro, carefully pointed out the "separateness" of the defendants—that the jury must render a separate verdict on each company. Merck's production didn't start until almost a year after the others', he said. The government charges that each defendant entered the conspiracy between Jan. 1, '54, and July 1, '55. But, Shapiro pointed out, Merck hadn't set a price or begun to market the vaccine until Jan. '56, and did not make its first sales to the government until the following May.



COURTROOM CAST

Presiding over the criminal trial of five Salk vaccine producers is Judge Phillip Foreman (*above*), who will move up to a higher court at the trial's end. Pressing the government's charges: Lewis Bernstein (*right*), Justice Dept. special litigation chief. Former New York Governor Thomas E. Dewey (*below*), one of 19 defending lawyers, led off the defense with an energetic two-hour discourse.



New Suit, Old Battle

A new chapter in the long-running legal feud between Sterling Drug Inc. and Farbenfabriken Bayer was opened late last week by a \$5-million damage suit filed by Sterling in U.S. district court in Newark.

Defendants in the suit are Smith, Barney & Co.—a New York investment house, which recently published a pamphlet describing the worldwide activities of the I. G. Farben successor—and five partners in the firm.

Sterling asserts that it has no connection with the German company, that it is sole owner in the U.S. of the trademarks Bayer and Bayer Cross, and that the booklet's use of those trademarks represents a "conspiracy" between the broker and Farbenfabriken Bayer designed to boost the latter's standing in the U.S., at Sterling's expense.

One-Time Owner: Sterling acquired the Bayer trademarks in 1919, when it bought the Bayer Co. of New York. The latter had been a subsidiary of Bayer Leverkusen, Farbenfabriken Bayer's predecessor, and had been seized as an enemy asset during World War I. (Farbenfabriken Bayer still

uses the trademarks outside the U.S.)

Sterling's suit also charges that the booklet uses "untrue statements" and omissions of fact to imply that the German company is now permitted by court decision to sell its products in the U.S. under the disputed trademarks, that Sterling produces aspirin under trademarks owned by Bayer, and that court action is pending in which Bayer seeks to recover the trademarks.

The passage in the booklet containing these alleged implications refers to Bayer's restraint of trade suit against Sterling, which is still pending.

Break for Drugmakers

While the Justice Dept.'s polio vaccine trial got under way in Trenton last week (p. 28), testimony at the Federal Trade Commission hearings in New York was turning up evidence that could undermine FTC's collusion charges against five producers and distributors of tetracycline.

Key element in FTC's charges is the contention that Pfizer, in obtaining its tetracycline patent in '54, misrepresented the results of fermentation recovery tests to hide the fact that

tetracycline is coproduced with Aureomycin—which had already been patented by American Cyanamid's Lederle Laboratories Division. The Patent Office asked that the tests be based on the Lederle procedure.

Testimony last week brought out an 11-year-old mistake that could explain the discrepancy between Lederle's and Pfizer's recovery data.

Slip of the Pen: Lederle technician Edna Doerr testified that in '48 she used one milliequivalent, or 0.035%, of ammonium hydroxide when she ran an experiment to find the best nutrient medium for fermenting *Streptomyces aureofaciens*. The experiment, under the direction of Lederle's Joseph Niedercorn, figured in his Aureomycin patent.

But, Mrs. Doerr told the hearing, when the experiment was transcribed from her lab notebook to the Aug. '48 monthly report—which both she and Niedercorn signed—the quantity of ammonium hydroxide was converted to 0.35%—10 times as much as was actually used in the experiment.

The mistake, explained Walter Mansfield, chief Lederle trial counsel, was not discovered until Mrs. Doerr was preparing for her testimony.

COMPANIES

Canadian Industries Ltd. has acquired control of Mastex, Ltd. (Winnipeg, Man.), and its associated company, Mastex Textiles, Ltd. A new company, Mastex Industries, Ltd., has been formed. Mastex was the first Canadian converter of polyethylene film in Canada. Plans call for expansion of production facilities.

EXPANSION

Paper: Bowaters Carolina Corp., a subsidiary of Bowaters Paper Corp., Ltd. (London), has revealed long-range plans to erect a \$25-30-million plant adjacent to its \$38-million pulp plant at Catawba, S.C. (opened three months ago), and near its \$7-million hardboard plant now under construction. No date was set for groundbreaking.

Carbon Dioxide: Chemetron Corp. (Chicago) said its Cardox Division will build a facility at Gibbstown, N.J., to recover carbon dioxide from ammonia. Costs were not revealed. Capacity: 155 tons/day of liquid

and solid carbon dioxide. Raw material will be obtained from Du Pont's nearby ammonia plant.

FOREIGN

Fertilizer/Puerto Rico: W. R. Grace has signed a contract to manage the Gonzalez Chemical Industries fertilizer plant at Guanica, Puerto Rico, and is negotiating to acquire "a substantial amount of stock" in it. Rated capacity of the plant is 125 tons/day of ammonia and 350 tons/day of sulfuric acid, most of which can be used captively to produce up to 400 tons/day of ammonium sulfate.

Tires/India: Dayton Rubber will provide technical collaboration and capital for a new Indian tire plant. Daily output of the \$3.4-million facilities will be 250,000 tires and an equal number of tubes. Dayton will provide required foreign exchange—around \$2 million—and Indian investors, including the state government of Kerala, will provide the rest of the \$8.4-million capitalization. A new company, Premier Tyre Ltd., is being set up to operate the plant.

► To users of granules and powders:

How to Reduce Material Handling Costs ...without Capital Investment!

Several of the larger producers of granular and powdered products are using expendable bulk packages of Wirebound-Corrugated construction. In some cases this change came about at the insistence of customers who wanted fewer packages to handle, yet didn't want the inflexibility and high initial cost of a returnable system.

These customers found that it required far fewer man minutes to unload 39 of the 50 cu. ft. capacity Wirebound-Corrugated "Rail Shippers" that normally fill a 40' 6" car to minimum carload weight, than the equivalent 1560 multiwall bags. For even if the bags were palletized in transit, they



still would have to be individually unloaded and individually emptied.

Likewise, one 23 cu. ft. Wirebound-Corrugated "Truck Shipper" replaced 20 bags, saving valuable time in handling. In both cases, existing material handling equipment—fork trucks or



hand pallet trucks and dumpers—could be used. So no capital investment was needed!

The decision to use the Wirebound-Corrugated packs was made only after comparing them to other types of expendable bulk containers. The Wirebound-Corrugated, with their wood-steel-paper-polyethylene composite construction were the more satisfactory in every case! Principal advantages are:

► 4-way entry, with 3 1/2" height for hand pallet trucks

- Positive moisture and contamination protection
- Safe, high-stacking—indoors or out
- 3/4" max. bulge, assuring easy unloading from cars and trucks
- Minimum carload weights
- 20% space saving over cylindrical packages
- Competitive container cost based on "per ton of material" handled

Your plant can probably reduce its material handling costs and increase its efficiency—without capital investment—by specifying granular and powdered materials be shipped in Wirebound-Corrugated Expendable Bulk Shippers. They are made and sold by the companies listed below, who would welcome the opportunity of supplying further details.

**package
research
laboratory**



ROCKAWAY, NEW JERSEY



Chicago Mill & Lumber Co., Chicago 3, Ill.; Crosby Forest Products Co., Piquette, Miss.; Elberta Crate & Box Co., Tallahassee, Fla.; General Box Co., Des Plaines, Ill.; Great Southern Wirebound Box Co., Magnolia, Miss.; Indianapolis Wire Bound Box Co., Fernwood, Miss.; Jones Box & Mill Div., The R. T. Jones Lumber Co., Inc., Buffalo 2, N. Y.; Lange & Crist Box & Lumber Co., Inc., Clarksburg, W. Va.; David M. Lea & Co., Inc., Richmond 12, Va.; Main Brothers Box & Lumber Co., Karnak, Ill.; Marinette & Menominee Box Co., Marinette, Wisc.; The Martin Bros. Container & Timber Products Corp., Toledo, Ohio; Maxwell Brothers, Inc., Chicago 8, Ill.; T. R. Miller Mill Co., Inc., Brewton, Ala.; Rathborne, Hair & Ridgway Box Co., Chicago 8, Ill.; Western Wirebound Box Co., Portland 10, Ore.

It's your move!



PROBLEM: As South you hold the hand illustrated. East-West vulnerable. East deals. The bidding has proceeded:

East	South	West	North
2 ♦	2 ♠	3 ♦	Pass
3 ♠	4 ♥	5 ♥	6 ♥
7 ♦	? What do you do?		

THE ADDITION of a new caustic-chlorine facility at our Geismar Works, immediately south of Baton Rouge, Louisiana, establishes Wyandotte as a multi-plant producer of these products . . . Wyandotte's second ethylene glycol plant is also located here.

It's your move now. First, by taking advantage of Wyandotte's multi-plant facilities . . . offering easy accessibility by rail and highway, as well as low-cost water transportation. And second, by the exciting possibility of "over-the-fence" supply by locating your plant on our 1200-acre Southern site . . . or in the adjacent area.

Why not inquire—find out how helpful Wyandotte can be. Write for information . . . or a get-together . . . today. *Wyandotte Chemicals Corporation, Dept. 696, Wyandotte, Michigan. Offices in principal cities.*

ANSWER

♦ J 10		♦ A K Q
♥ 10 8 7 5 2		♥ K J 9
♦ J 9 8 6 3 2		♦ A K Q J
		♦ A K Q

♠ 9 8 7 6 5 4 3 2		
♥ A Q 10 8 7		
♦		
♣		

If you bid seven hearts, you were right! The bidding would seem to indicate that East-West can make seven diamonds, and a nonvulnerable sacrifice should not be too costly. As it happens, your sound judgment brings an extra reward here, because you actually make seven hearts . . . and poor East, with 32 high-card points, can't take a trick!



Wyandotte CHEMICALS

MICHIGAN ALKALI DIVISION
PACING PROGRESS WITH CREATIVE CHEMISTRY

SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA • CALCIUM CARBONATE • CALCIUM CHLORIDE • CHLORINE • MURIATIC ACID • HYDROGEN • DRY ICE GLYCOLS • SYNTHETIC DETERGENTS (anionic and nonionic) • SODIUM CMC • ETHYLENE OXIDE • ETHYLENE DICHLORIDE • POLYETHYLENE GLYCOL • PROPYLENE OXIDE • PROPYLENE DICHLORIDE • POLYPROPYLENE GLYCOL • DICHLORODIMETHYLHYDANTOIN • CHLORINATED SOLVENTS • OTHER ORGANIC AND INORGANIC CHEMICALS

Washington Newsletter

CHEMICAL WEEK
October 24, 1959

A new push to ease federal controls on natural gas will be made by the petroleum industry—for the third time in five years—when Congress reconvenes. The industry claims that control of prices at the wellhead is stifling the drive for exploration and will cause a dwindling supply of gas. Opponents—including many legislators from Northern and Eastern consumer states—say that removing controls would set up a semimonopolistic situation, open the way for the gas industry to set its own prices.

Ever since the Supreme Court in '54 ruled that the Federal Power Commission has control over wellhead prices, producers have been fighting to get remedial legislation. President Truman vetoed one bill, President Eisenhower another, and a third never reached the House floor. If the '60 election year proves too touchy a time for the big push, at least the ground will be broken for one the following year.

•
Deadline on use of seven delisted coal-tar colors may be appealed by food, drug and cosmetics manufacturers. The object would be to delay the cutoff long enough to get some color additives legislation through Congress that would permit their continued use. A bill has already passed the Senate and is awaiting House action.

The cutoff dates for batches of color already certified are Jan. 1 for Oranges 1 and 2, Yellows 1, 3 and 4 (margarine), and Red 32; and Jan. 15 for Red 1. Manufacturers may have to throw out some stocks, but the amount is apparently negligible. And products already made with these colors can be sold.

The Food & Drug Administration says that if an appeal is made on reasonable grounds, hearings will have to be granted and the effective cutoff dates postponed.

•
Editing of antibiotics journals by an FDA official has been stopped under a new directive covering writing, consulting and teaching activities of Health, Education & Welfare Dept. employees. The directive prohibits all such activities that might present a real or apparent conflict of interests. It was brought about by published criticism of editorial positions held by Henry Welch, chief of FDA's Division of Antibiotics.

H-E-W Secy. Arthur Flemming paid tribute to Welch's high reputation in the field, said he had long had permission to edit the journals and there was no "real" conflict of interest, but that he would have to comply with the new regulations. How many other employees in FDA and H-E-W, generally, will have to give up writing and consulting has not been determined.

•
Some changes in FDA's field organization are recommended in a study by the management consulting firm of McKinsey & Co. One is that analytical chemists be eliminated in districts where there are no drug manufacturers and they have little to do. FDA believes, however, that

Washington

Newsletter

(Continued)

these chemists should be kept on hand for emergency purposes and be fed work from other districts to keep them busy.

Other recommendations, generally agreed to by FDA: increase personnel in the field, increase the number of resident inspection posts, set more specific performance standards for inspectors and analysts.

•
The "widow and orphan" mail on high drug prices is deluging Senator Kefauver's antitrust subcommittee, which is probing the drug industry. The committee has received "hundreds and hundreds" of letters, far more than was generated by administered-price probes of steel, autos or bread. None take the industry's side.

Most of the letters are generated simply by newspaper articles about the coming hearings, and it is all individual mail. Typical letter: one from an Ohio farmer, written in pencil on lined yellow paper, saying he and his wife both suffer from arthritis and are paying 28¢ a pill.

Start of the hearings has been rescheduled from Nov. 30 to Dec. 7 because of Senator Kefauver's commitments in Tennessee.

•
The Pharmaceutical Manufacturers Assn.—which is spearheading the industry campaign to demonstrate the value of today's drugs—is currently interviewing public relations organizations.

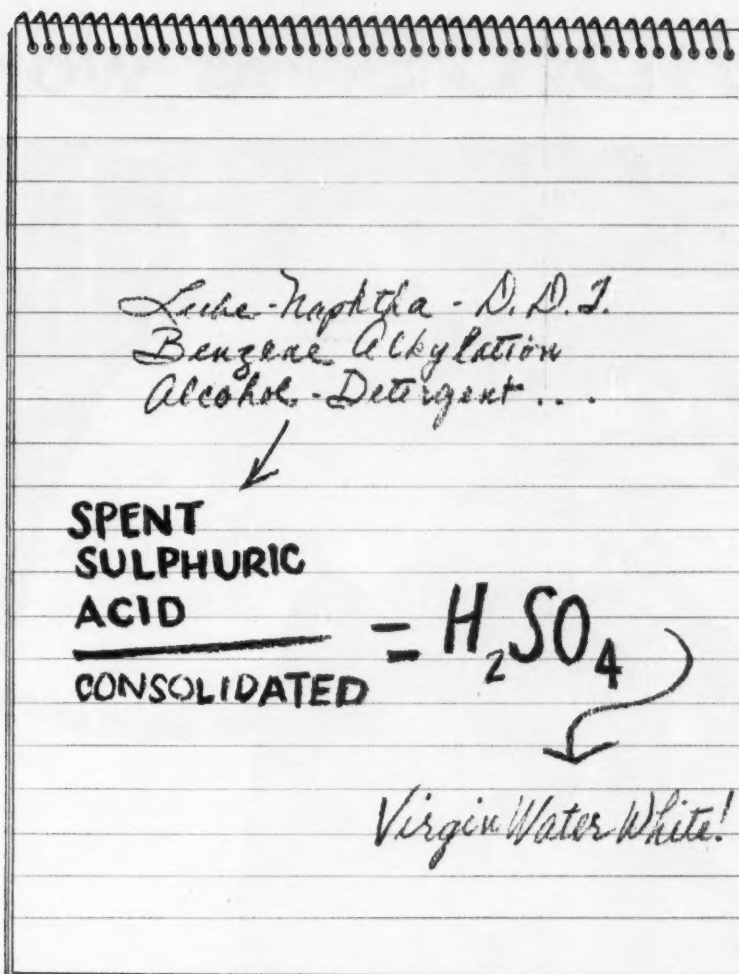
•
Conventional fuels will be plentiful, at least through '75, with no increase in relative costs. This is the gist of hearings held by the Senate-House Economic Committee last week. One important conclusion is that economic feasibility of atomic energy will depend on bringing its cost down to current power levels instead of banking on shortages of conventional fuels to make more costly atomic power attractive.

•
Supreme Court decisions important to CPI industries will be made in the current term. To be tested are these labor issues:

- Right of unions to engage in political activities. The Georgia supreme court said union shop provisions of the Railway Labor Act are unconstitutional because compulsory union dues are spent for "political education" without the members' consent. If upheld, the decision could greatly curtail the political power of unions.

- Right to strike if not consulted before jobs are abolished. In this case, an injunction was issued to stop a strike called to support a contract provision requiring company-union agreement before a job could be eliminated.

By refusing to review other cases, the Supreme Court upheld decisions that (1) volume rebates to large shippers are illegal; and (2) the National Labor Relations Board is entitled to wield broad injunctions against any secondary boycott activities by the Teamsters Union in organizing nonunion truckers.



Send your spent sulphuric acid through Consolidated and get it back as water-white H_2SO_4 . Normally we deliver 99% but you can have it to a fraction of a percent... tailor-made for your plant process as delivered.

Spent acid shipments and acid deliveries by truck, tank car or barge—yours or ours—to or from our regeneration plants at Houston and Baytown, Texas, Baton Rouge, La., Hammond, Ind., and Dominguez, Cal.

Consolidated transportation facilities are an advantage, too. We have a large fleet of barges and tank cars and an exceptionally fine traffic department. Movements are traced day by day... deliveries are prompt and reliable.

Sulphuric acid is also shipped from other plants at Fort Worth and Corpus Christi, Tex., LeMoyne, Ala., Vernon and Richmond, Cal., and Tacoma, Wash.



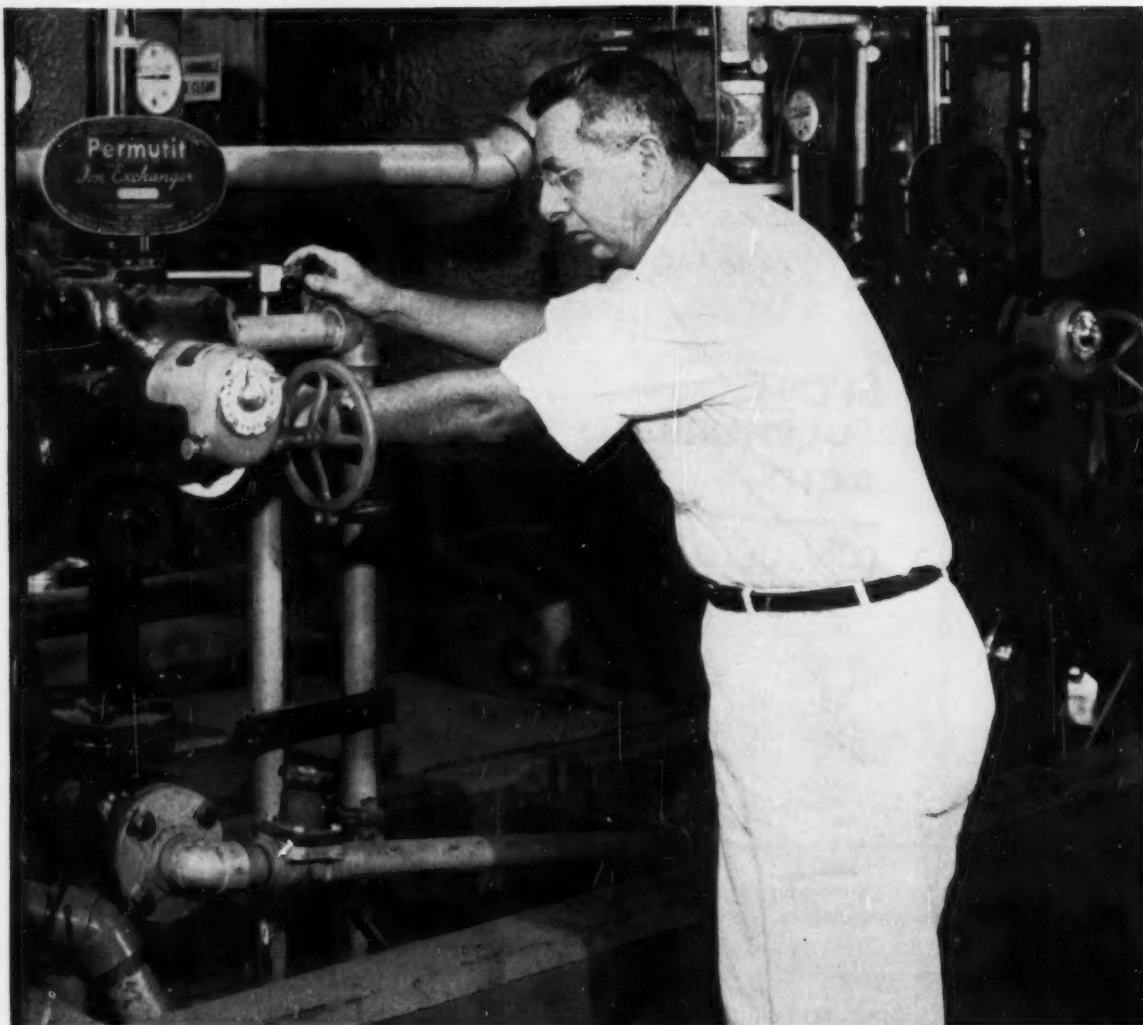
STAUFFER CHEMICAL COMPANY

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CONSOLIDATED CHEMICAL INDUSTRIES DIVISION, 6910 Fannin St., Houston 25, Texas

FLUIDICS* AT WORK



Making cosmetics at the Bristol-Myers Company plant in Hillside, N. J., calls for water free of minerals. This Permutit "Q" Unit is part of the complete water conditioning system now in operation here.

Integrated water conditioning cuts costs, improves efficiency at Bristol-Myers

Just as you are particular about the water you brush your teeth with, so is Bristol-Myers particular about the water they use to make their toothpaste . . . as well as their many other well-known toiletries and cosmetics.

Three different wells supply the water. Each has a different mineral content. To change all three into one chemically pure water for uniform processing, Bristol-Myers has always relied on Permutit equipment.

But the modern, new Permutit two-step demineralizing system at their Hillside, N. J., plant is a far cry from the cluster of small Permutit demineralizing units one used to see on the roof of the plant near the water tank.

Increased volume. To handle the plant's thirst for a much greater volume of demineralized water and to step up effi-

ciency at the same time, Bristol-Myers recently installed a Permutit two-step system.

The cation exchanger is a high-capacity Permutit "Q." The anion unit uses a highly basic Permutit "S."

Completely integrated. The new demineralizing equipment is located in the boiler room, along with two Permutit Zeolite Softeners used for treating boiler feedwater. With all water conditioning in one location, handled by one staff, the operation is simplified and less costly.

Is it time for you to investigate the savings possible from integrated water conditioning systems? We should be happy to provide literature on our full line of equipment, answer questions, or consult with you.

In-plant "airlift" ends waste disposal problems, reclaims usable materials

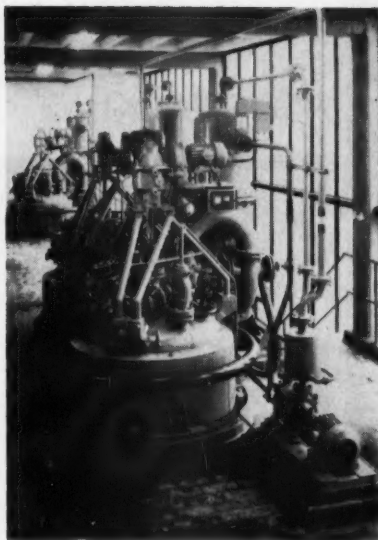
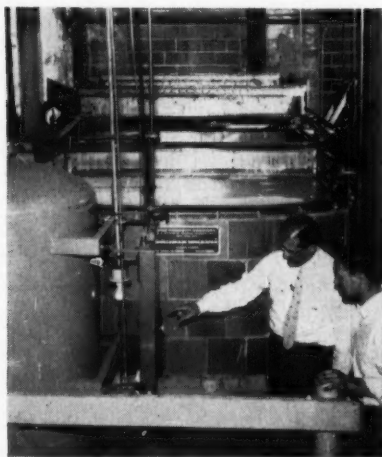
You start with a specially designed mechanism for forcing air into solution with your waste waters. Then, feed the waters into a tank open to atmospheric pressure. This sudden pressure drop forces the dissolved air to bubble out of the solution. The bubbles collect around minute solid particles and *lift* them to the surface, where you easily skim them off.

Simple? Yes. Efficient? Extremely. Do you have to build it yourself? No. Because you can already get it from Permutit.

It's called the Permutit Colloidair System and it's designed for handling waste waters containing solids. For example, International Harvester uses Colloidair in their Ft. Wayne plant. The waste waters hold soluble and insoluble oils, alkaline cleaner fluids, mineral acids, corrosive salts and other contaminants. Obviously, such effluent is not suitable for dumping into an open stream. But with Colloidair, solids are "airlifted" to the surface for disposal in an open drying pit. And the clarified liquids (less than 10 ppm oil) go into the stream without contaminating it.

The Homasote Company, makers of fiber wallboard in Trenton, N. J., run waste white water through the Colloidair System. Bubbled out fibers are reclaimed; the clarified water is clear enough for use in pump glands, stuffing boxes and for general cleanup.

You can get a Permutit Colloidair System in steel or tile . . . and with special corrosionproof lining. For more details on the in-plant "airlift" for waste waters, write for our Colloidair booklet.



How FLUIDICS operates locally in the European Common Market

What's unusual about the Glasteel reactors you see pictured here?

First, they are in use at the Riedel-de Haen plant in Seelze, Germany. Second, they were fabricated in Germany by our subsidiary there, Pfaudler-Werke A. G. (established 1907).

These particular 12,000-liter reactors are used in the production of some 500 chemicals, to purity specifications that stretch out to five and six decimal places. The same Glasteel construction found in American-made Pfaudler equipment goes into these reactors, making them resistant to the usually corrosive attack of most acids and mild alkalis.

You'll find FLUIDICS working for one of Europe's biggest manufacturers of pharmaceuticals. In this case it's a large pilot plant operation utilizing three 4000-liter-capacity Glasteel reactors. And so it goes.

Suggesting that, if you are operating within the Common Market, you can take advantage of our inside position to service your needs for process equipment.

FLUIDICS around the world, you see, is not merely a slogan: it's a fact—since Pfaudler Permutit, along with its German subsidiary, has plants in Great Britain (Enamelled Metal Products Corp. Ltd.), Canada (Ideal Welding Co. Ltd.), Mexico (Arteacero-Pfaudler, S. A.), Japan (Shinko-Pfaudler Co., Ltd.), as well as four plants in the U. S. A.

NEW THROUGH FLUIDICS

... ultimate water

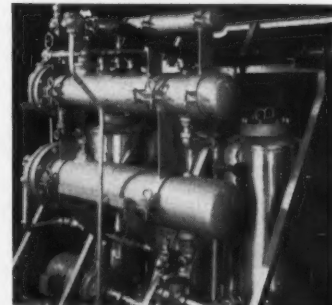
How clean does water have to be if you want to use it to rinse a transistor free of all contaminants? It must be ultimately clean.

Water for such a purpose does exist. We call it *ultimate water*. Ultimate water makes distilled water seem almost salty!

In fact, so pure is ultimate water that, by comparison, ordinary drinking water seems almost solid, loaded as it is with dissolved minerals, salts, suspensions, and similar impurities.

Probably the best measure of how ultimate water stacks up against the kind you are most familiar with is resistance. Generally, tap water is a fair conductor, having a resistance of from 1000 to 10,000 ohms. Ultimate water on the other hand, acts like an insulator; it has a resistance of up to 20,000,000 ohms.

For more details about ultimate water, drop us a note. You'll receive a prompt reply.



ULTIMATE WATER is produced at 10 GPM in this preassembled, skid-mounted package.



New FLUIDICS Buyer's Guide

gives you a complete look at the many products and services offered through the Fluidics program. It

shows you how to get answers to problems in such fields as corrosion, water and waste treatment, reaction, metering, fluid control, etc.


For your free copy, write to our Permutit Division, Dept. CW-109, 50 West 44th Street, New York 36, New York.

*FLUIDICS is a new Pfaudler Permutit program that provides a modern, imaginative approach for handling and processing liquids and gases more profitably.



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'ISOCRACKING'

WHERE IT FITS INTO TI

Process

Isocracking

Cat reforming

Isomerization

Alkylation

Polymerization

Distillation

Cracking

New Octane

A versatile companion for catalytic reforming and other processes aimed at upgrading refinery streams (see table) is a new development of California Research Corp. (San Francisco), research arm of Standard Oil Co. of California. Cal Research calls its new process Isocracking, says it's the first commercially proved (at Richmond, Calif.) low-temperature hydrocracking process.

Refineries that maximize their yield of high-octane gasoline and minimize output of low-value by-products can use Isocracking to convert middle-boiling distillates (valued at \$3-4/bbl.) into high-octane gasoline (valued at about \$7/bbl.). This is the first process that can crack heavy naphtha or light cycle oil, for instance, to highly isomerized, octane-boosting materials with only a small proportion of by-product fuel gas.

Such a process, essentially a combination of reforming and isomerization, has been the goal of refiners for many years, but has proved an elusive target. Cal Research says its success is due to a "rugged, long-life" catalyst, developed only after 100,000 hours of pilot-plant study of over 1,000 catalysts. Until patents issue, the nature of the final catalyst will remain one of the company's most closely guarded secrets. But a hint may be found in its statement that

ENGINEERING

REFINER'S BAG OF TRICKS . . . AND WHAT IT OFFERS

Feed Stock	Higher-Octane Products
Middle-boiling streams	Blending stock and reformer feed
Heavy naphthas	Alkylation feed and blending stock
Paraffins	Isoparaffins
Paraffins, olefins	Isoparaffins
Olefins	Isoparaffins

Gasoline
pool

- Higher yields of high-octane gasoline.
- Use of low-value refining streams.
- Reduced output of low-grade by-products.
- Low-temperature operation.
- 50-70% conversion per pass.
- Applicability to conventional equipment.

Booster Brings Down By-Products

"the catalyst costs much less than conventional noble metal reforming or isomerization catalysts."

Low-Temperature Process: Thanks to the new catalyst, the process operates at unusually low temperatures (400-700 F) that favor an unorthodox product mixture.

Some of the results of this combination of catalyst and temperature:

- Almost no methane is produced, with the total C₁-C₃ fraction making up less than 5% (by weight) of the product mix.

- In the C₄ fraction, the highly predominant isomer is isobutane, a valuable octane-booster.

- The next higher fraction (from C₅ to a boiling point of 180 F), called light Isocrackate, can be used as an octane-raising blending stock.

- The heavy Isocrackate (180-400 F) can be reformed directly into gasoline with an octane rating of 103-105.

- Conversion is 50-70% per pass.

- Carbon steel can be used as the major material of construction, with a low chrome-moly alloy steel used in portions of the reactor system.

- Plant investment is comparable to that needed for catalytic reforming.

Varied Applications: Depending on the particular needs of the refiner, Isocracking can be put to varied uses. For instance, heavy cracked naphtha,

normally not usable in premium gasoline, can be Isocracked to yield a fraction that upgrades gasoline (after moderately severe cat reforming) and a lighter fraction that can be used directly for blending. Both products raise the octane number of the gasoline as well as improving its volatility.

Another useful feed stock for Isocracking is light catalytic cycle oil. Refineries with an excess of this stock, used in cutting fuel oils, or those that wish to reduce fuel oil output can use the new process to convert the light cycle oil into high-grade gasoline.

Isocracking is not aimed at replacing any of the refiner's present bag of tricks, but is actually an addition to it. Its purpose is to work with such other techniques as reforming, isomerization, alkylation and polymerization to give the refiner more flexibility in his operations, allow him to maximize his desired product.

A nagging question, however, raises some doubt as to the eventual importance of the process: Which direction will demand for high-octane gasoline take? Large-scale production of small cars signals a general slowdown in the octane race that has followed the trend toward higher-compression engines. Should high-octane gasoline start to tail off in demand, Isocracking would undoubtedly lose

some of its appeal. This eventuality is somewhat far-fetched, however, as the most conservative prediction at the moment is that high-octane material is merely approaching a demand plateau.

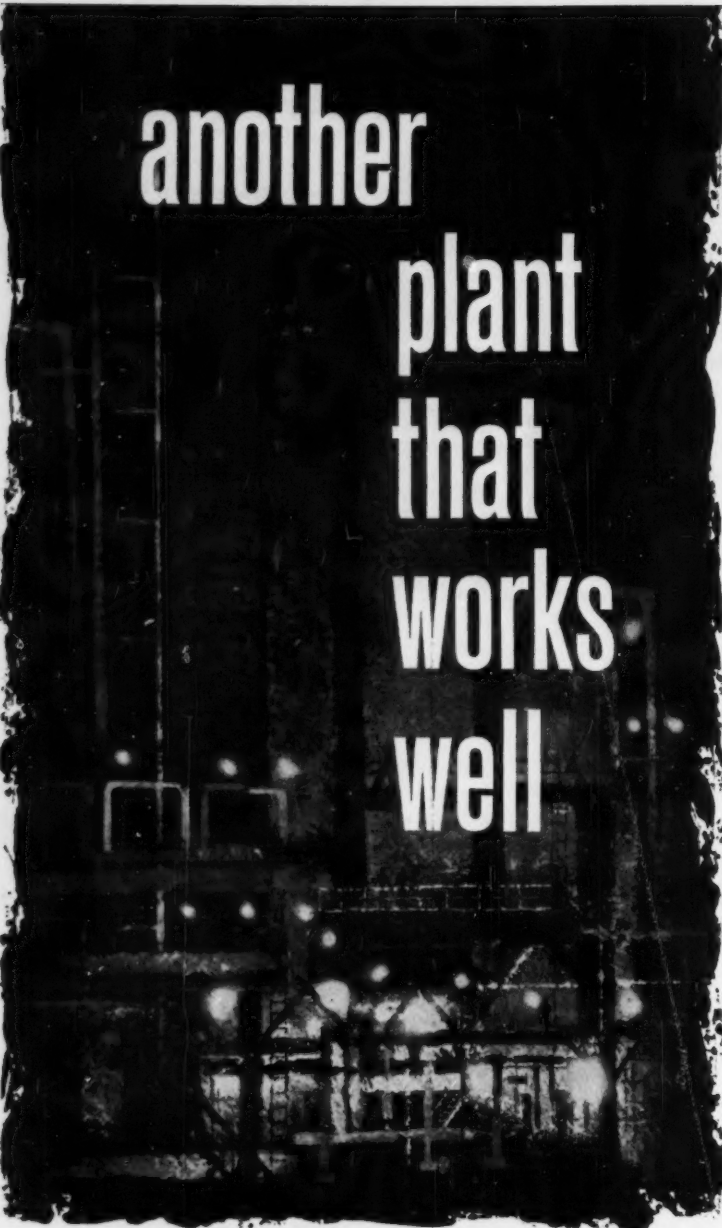
In any event, current market factors and the economics of each particular refinery will determine whether the installation of an Isocracker can be justified in a given case.

Economic Estimates: Cal Research has worked out the estimated economics of using a 7,000-bbls./operating-day Isocracker in an existing refinery with incremental utilities available and operating at 90% stream efficiency.

For instance, a new unit to Isocrack heavy naphtha for gasoline quality improvement will require an investment of about \$4.6 million if existing reforming facilities can be utilized, \$7.6 million if a new reformer is needed.

Operating costs, in either case, run about \$33-35,000/calendar day, while product realization is about \$45,000/-CD (including \$40,000 for premium-grade gasoline). On the basis of these figures, the payout period is 1.3 years if a reformer is already in place, 1.8 years if a new reformer is needed.

In another case, light cycle oil can be Isocracked for the dual purposes of reducing fuel oil production and



another plant that works well

The reason is still simple. Sound engineering, right from the start. Early joint efforts between company researchers and contracting engineers meant both quick start-up and a trouble-free plant design that has not and will not become dated.

Today, several top-flight process engineering firms serve the complex chemical industry. Vitro is one of these—with an important advantage. It has specialized in the hard-to-do jobs; the ones which haven't been done before or at best are new processes fresh out of the lab. This is Vitro's unique contribution.

engineering the future—

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ENGINEERING COMPANY

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A DIVISION OF VITRO CORPORATION OF AMERICA

ENGINEERING

improving gasoline octane ratings. Here, plant investment comes to \$9.5 million if by-product hydrogen is available, \$11.9 million if a hydrogen plant is needed. Respective payout periods of 1.3 and 1.8 years are realized by producing \$49,000/CD of product (including \$46,000 worth of premium gasoline) at a cost of \$29-31,000/CD.

Conventional Process Flow: The equipment needed for an Isocracking plant is not out of the ordinary: reactor, heat exchangers, compressors, hydrogen furnace, and distillation facilities. Incoming feed is heated in an exchanger by the reaction mixture, joins a stream of heated hydrogen and enters the reactor, which operates at 400-700 F, 500-2,000 psig.

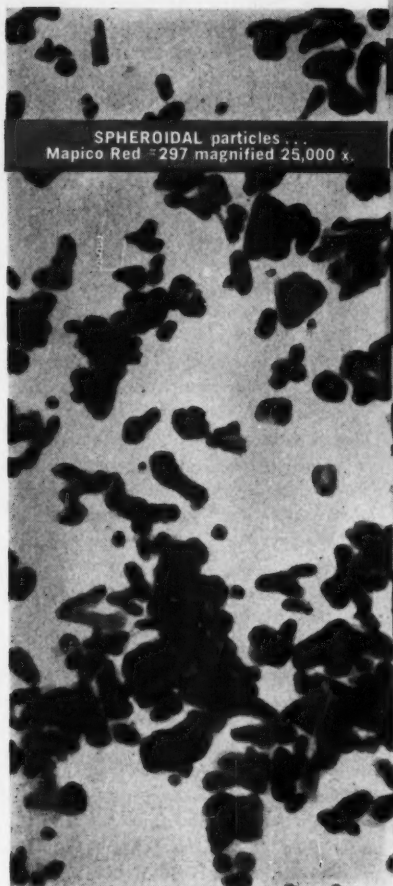
The exit stream, after heating the feed, is cooled further, sent to successive units that recycle hydrogen and remove the small amount of fuel gas produced. A stabilizer separates the C₄ fraction from the higher boilers and sends it to a depropanizer. This returns propane to the fuel gas stream, leaving a C₄ product consisting mostly of isobutane.

The stabilizer bottoms go to a splitter that produces the light and heavy Isocrackates and recycles all material boiling above the desired gasoline end boiling point (400 F). The normal conversion rate for the process is 50-70% per pass.

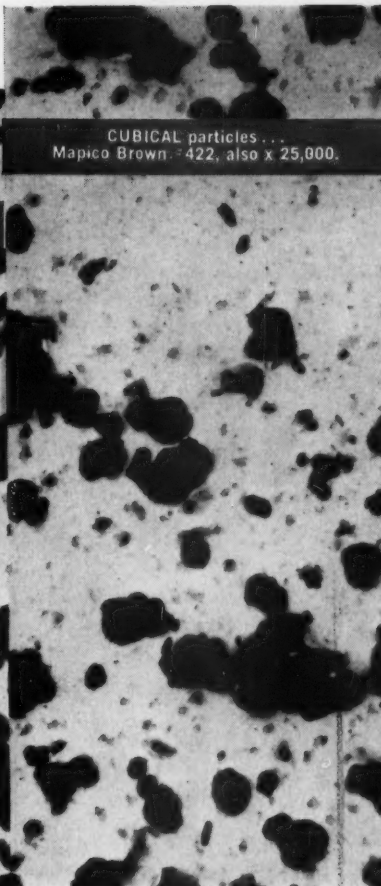
Unusual Product Mix: Cal Research attributes the unusual product mix obtained to the mechanism of the Isocracking reaction rather than to thermodynamic considerations. Among the unusual results:

- Light fractions contain a ratio of isoparaffins far on the "iso" side of the thermodynamic equilibrium.
- Heavy aromatics are cracked without substantial saturation or loss of ring structure.
- Methyl groups from cracked aromatics combine to form liquid isoparaffins rather than appearing as methane.
- Heavy naphthenes are cracked without appreciable loss of ring structure, yielding naphthenes in the C₇-C₈ range, which reform to octane-improving toluene and xylene.

Among the specific results, isobutane and isopentane are found in high proportions normally obtained by low-temperature isomerization, while the methyleyclopentane-cyclohexane



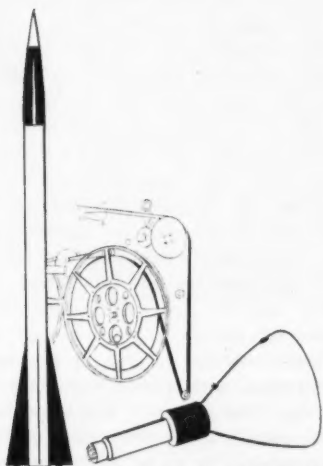
SPHEROIDAL particles...
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ACICULAR particles...
Mapico Red #516-M x 25,000.



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Mapico iron oxides are specifically tailored for "breakthrough" technology... are essential in many modern applications, such as ferrites for television and radar... magnetic tapes... catalysts for rocket fuels.

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Long used as color pigments and well known for their purity and uniformity, Mapico® synthetic iron oxides fill the most exacting technical requirements of the new space age. Available from Columbian is a wide range of iron oxides differing in particle size, particle shape, surface area, chemical composition. Columbian's exclusive manufacturing processes permit precise control of such preselected characteristics as oil absorption, reactivity, bulk density. Today, Mapico has "built in" qualities to meet your most precise requirements!

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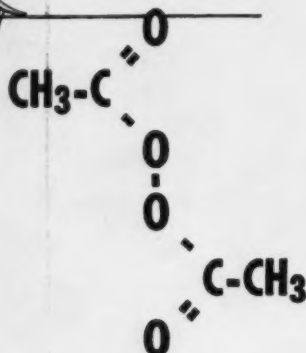
MAPICO IRON OXIDES UNIT

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Let Mapico make an important contribution to your product.



ACETYL PEROXIDE



a source of
HIGHLY REACTIVE
LOW MOLECULAR WEIGHT
ALIPHATIC "FREE RADICALS"

SPECIFICATIONS

Acetyl Peroxide 25.0%
Active Oxygen 3.4%

Acetyl Peroxide (25% solution in dimethyl phthalate) is a good initiator for polymerization reactions. It is often preferred over other diacyl peroxides for its ease of solubility, freedom from non-volatile decomposition products and the aliphatic rather than the aromatic nature of the resulting free radicals. These highly reactive low molecular weight free radicals permit the use of comparatively small percentages (1-2%) of the 25% solution in initiation of polymerization reactions.

Acetyl Peroxide solution has been used as a catalyst for the curing of unsaturated polyester resins and is especially effective for low temperature cures in the range of 122-176°F. Polymerization of methyl methacrylate and other monomeric acrylate esters has been initiated by the 25% solution at temperatures of 104-122°F.

Mixed monomer adhesive compositions, using 0.04-0.4% of 25% acetyl peroxide solution as a polymerization catalyst, are capable of rapidly forming adhesive bonds between glass, metal, plastic and wood articles with no clamps or supports needed after the first few minutes.



WRITE FOR DATA SHEET

LUCIDOL DIVISION

WALLACE & TIERNAN INCORPORATED

1740 Military Road
Buffalo 5, New York

ENGINEERING

fraction contains the former isomer in the high ratio to be expected from high-temperature isomerization. Both results help push up the octane number of the final gasoline.

The low fuel gas production of the process is a major factor in the high yields obtained (greater than 100 volume percent of finished gasoline compared with total feed).

Alternate Uses: In addition to octane improvement and fuel oil reduction, Cal Research foresees a number of other uses for Isocracking, including these: gasoline volatility control, jet fuel production, conversion of paraffinic raffinates into light isoparaffins, conversion of coker distillates into high-quality catalytic reforming feed stock, and conversion of low-octane paraffinic gasolines into light isoparaffins.

For one application or another, Isocracking will be getting close scrutiny from refiners in coming weeks.

Processing Progress

Some significant processing developments were turned up at the early-October meeting of German *Verfahrens-Ingenieure** at Essen. Among them: new ways to reduce iron ores, gasify coal and approach nuclear fusion.

The iron ore reduction process—the Wicke process—as developed by Muenster University and Phoenix-Rheinrohr AG. (Duisburg), consists of reacting finely divided, high-grade ores with a gas stream rich in carbon monoxide. Not designed to replace the blast furnace operation, the carbon monoxide reduction is aimed at processing the fine-grain or powdered ores that cannot be handled in a blast furnace, and to process furnace flue dust. It's said to require low investment, be adaptable to a variety of gas sources and feed materials.

Processing is carried out in a fluidized-bed reactor. Product of the first step (an iron oxide-carbon mix) can be fed to a blast furnace or further reduced to iron in a second treatment with carbon monoxide at 940 C. The process is said to operate successfully in the presence of sulfur, phosphorus or up to 20% inert gas.

Continuous Gasification: A new

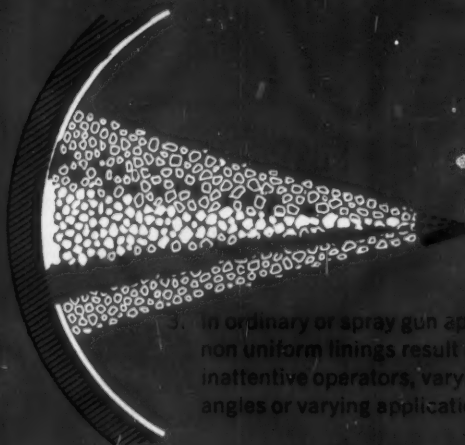
* Literally "process engineers", the closest equivalent to chemical engineers in Germany, where chemists and mechanical engineers do most of the chemical engineering (*CW*, Dec. 21, '57, p. 65).



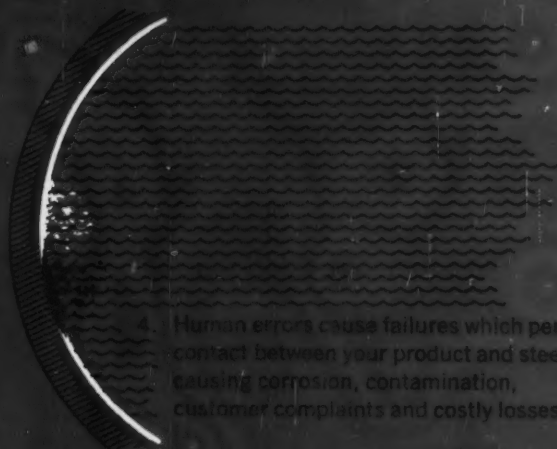
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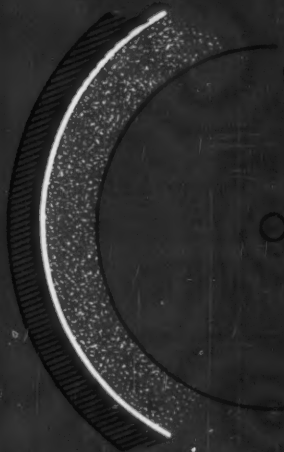
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ENGINEERING

high-speed, continuous coal gasification method developed by Lurgi Gesellschaft fuer Waermetechnik GmbH. (Frankfurt) and Ruhrgas AG. (Essen) has proved itself in pilot tests, is being used in a commercial plant built by Ruhrgas.

The process uses a heat carrier, such as coke, to which 3-10% (by volume) hard coal is added (maximum particle size: 3mm.). The mixture is fed continuously into a horizontal reactor (at 400 C) by a screw conveyor. Reaction, resulting in gas and tar, takes place in about 0.1 second. Cracking the tar at 930 C yields additional gas.

Fusion Progress: A "fast compression" thermonuclear apparatus designed at Aachen Technische Hochschule was reported to have produced 10^8 - 10^6 neutrons on the application of each impulse of 10^{13} amps. The electrical shock, applied to a broad metal clamp attached to a container of deuterium, produces a gas plasma and a large number of neutrons. Whether any of the neutrons are formed by thermonuclear action is yet to be determined. However, the apparatus is said to offer a good yield of neutrons at low equipment cost, may be useful for basic studies on the nature of plasma.

Crystal Growing Grows

Linde Co., division of Union Carbide Corp., recently disclosed that it has successfully adapted its flame-fusion crystal-growing techniques (*CW*, Sept. 19, p. 79) to the production of single crystals of incongruently melting materials—compounds that ordinarily form polycrystals of varying composition.

Linde is now offering single-crystal yttrium iron garnet (YIG), which has potential application in solid-state amplifiers.

At slow growth rates (0.1 in./hour or less) in a modified Verneuil furnace, YIG powder is added to the molten cap of the growing crystal boule, which becomes enriched in ferric oxide as yttrium orthoferrite ($YFeO_3$) precipitates. When the molten cap reaches a certain composition, pure yttrium iron garnet ($Y_3Fe_5O_{12}$) crystallizes at the bottom of the melt, producing the single-crystal product in the center portion of the boule.

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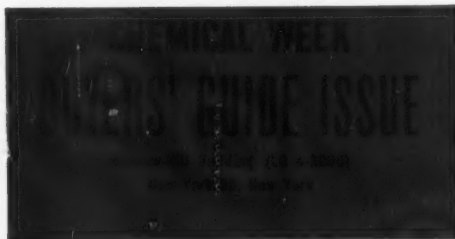
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Torrance, Calif.

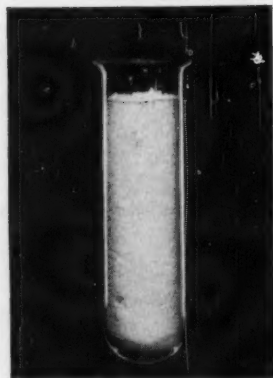
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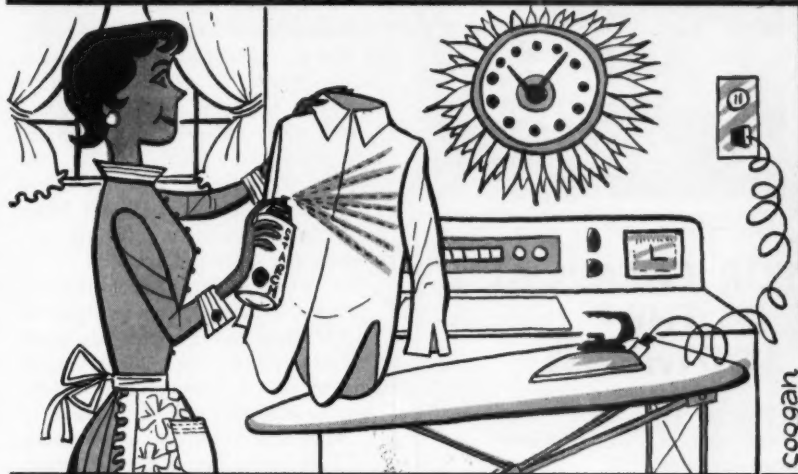
SPECIALTIES

Convenience is the pitch in changing laundry starch picture



YESTERDAY

Household starches were hard-to-prepare, low-cost items.



TODAY

Wash-and-wear has sparked search for convenience.

Household Starches Enter Pushbutton Era

In the next few months, at least half a dozen companies will bring out laundry starches in aerosol dispensers. Packaging of the familiar household item in this novel form is an attempt by starch makers to counter a declining market for their products. The advent of wash-and-wear-treated cottons and the growing acceptance of synthetic fibers have forced starch makers to look for new ways to boost dollar volume, while tonnages slip away.

Several companies with aerosol products are already in market-testing stages. General Aerosols Inc. (Shelton, Conn.) is packaging an 8-oz. vege-

table starch called Aeromagic, selling the 98¢ item in New England and part of Canada. And in Boston, Armstrong Laboratories is filling a polyvinyl acetate-type starch for General Starch Corp. This product is being sold locally under the tradename Glis. Also in the aerosol field is Union Starch Refining Co. (Columbus, Ind.). It is locally test-marketing an aerosol vegetable starch tradenamed Pennant.

None of these companies is among the big laundry starch makers in the country and they lack the kind of advertising budget necessary to sell the public—and supermarket buyers—on aerosol units. However, there

are about 15 companies now evaluating aerosol starches (giant A. E. Staley Mfg. Co. is said to be among them) and the future for the pushbutton starches looks promising.

Not only do the makers of aerosol starches hope to capture a share of existing starch markets; they also figure that aerosol dispensing (which can go onto wet or dry clothes) will provide additional markets. One possibility: dress shops and department stores—for touchup starching. Some others: travelers, boarding schools and hotel valet shops.

But there are other innovations in starch marketing. Several companies

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SPECIALTIES

are preparing starch in one-use film packs. These one-shot packages will be marketed to housewives and sold to "laundermats" for vending-machine marketing. The trend toward equipping laundermats with ironing facilities should soundly boost the market potential of these items. Also being looked at is the packaging of starch in soluble packs—to be used in washing machines.

Who's in It: Today, the U.S. home laundry starch business is a \$40-45-million/year business, split almost equally between the dry products and liquids. Vegetable starches (almost all corn-based) are still the most popular type, dollarwise account for 80% of liquid and dry products sold. Plastic starches (mostly polyvinyl acetate) have about 15% of the market and carboxymethyl cellulose 5%.

A. E. Staley (Decatur, Ill.), which is now marketing the top-selling liquid starch Sta-Flo as well as Staley Cube Starch and Cameo Powder, is probably biggest in the home laundry starch field, dollarwise. It's estimated the firm has 45-50% of the total market for starches. And the recent licensing arrangement between Staley and The Hubinger Co. (Keokuk, Ia.) should give Staley another 5% of the total starch dollar. Under this arrangement, Staley gets sole rights to manufacture and distribute household starches under the Quick Elastic trademark. (Hubinger will discontinue manufacture and sale of its line.)

Next-biggest company in the household starch business is Corn Products Co. (New York), which, besides producing the top-selling dry vegetable starch Niagara, also markets dry and liquid Linit and Argo Lumps.

The rest of the market for the vegetable starches is split among a number of much smaller firms, most of which market on a regional basis. In the East, one of the major sellers of vegetable starch is Zippy Products (Lansdowne, Pa.), which originated its Zippy Liquid Starch in '44, now sells on the Eastern seaboard as far south as North Carolina. According to trade sources, Zippy accounts for around 5% of the over-all household starch dollar.

In the South, one of the leading vegetable starch makers is Texize Chemicals Inc. (Greenville, S.C.), which sells a homogenized liquid starch. Also selling in the South and



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Chemical Week • October 24, 1959

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PRODUCTION USE

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CHEMICAL MATERIALS FOR INDUSTRY



G59-7

part of the Midwest is Household Products (Wilson, N.C.), which franchises manufacturers to turn out household starches under its Easy Monday label. This is sold only by food brokers to grocery chains and wholesalers.

In the Midwest, two of the big regional sellers of vegetable starches are Union Starch Refining, which sells Reddi-Starch liquid in Indianapolis, Cincinnati and Columbus, and Faultless Starch Co. (Kansas City, Mo.), which sells dry Faultless Starch in most of the Midwest.

In the West, one of the most popular vegetable-type starches is Vano, a product manufactured at Oakland, Calif., by B. T. Babbitt Inc. (New York), which acquired the company from Chemicals Inc. about two years ago. It is said to have almost 50% of the market for liquid vegetable starches in the West, about 5% of the over-all starch market.

Plastics Inching Up: Though the plastic starches—almost all are now made from polyvinyl acetate—got off to a fast start when brought out in the late '40s, their climb appears to have leveled off, and trade sources now peg their share of the over-all dollar market at around 10-15%.

These "permanent" (good for 10-15 washings) starches were regarded as answers to the housewife's dream when they first appeared, but some discontent has arisen, chiefly because of the yellowing sometimes produced. Another complaint—more persistent—has been about the need for a sorting system to keep permanently starched items separate from non-starched ones. With the vegetable starches (which wash out), this isn't necessary and housewives new to the plastics find themselves with stiff-as-a-board items on their hands after using plastic starches too liberally and frequently. Removing this stiffness is no easy matter.

Despite the alleged drawbacks of plastic starch, this type of product will probably continue to gain steadily in the starch field. Certainly one reason for its growth is its popularity among private-brand sellers. It's possible to buy completely formulated products from firms such as Polyvinyl Chemicals (Peabody, Mass.), which require nothing from the marketer but repackaging. The plastic starches lend themselves to private-brand selling better



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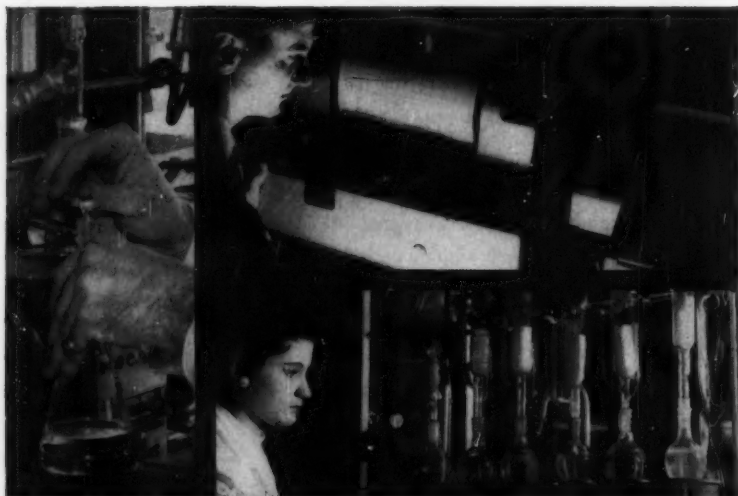
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SPECIALTIES

than do the vegetable starches because their higher markup makes up for their lack of turnover.

One of the major companies selling plastic starch is Dumas Milner (Jackson, Miss.), which turns out Perma Starch at its plant in Illiopolis, Ill. This polyvinyl acetate emulsion contains what Dumas Milner calls DM-3, an additive said to keep clothes free from body odor through repeated washings. Though Dumas Milner wouldn't say what the additive is, trade sources say it may be trichlorosalicylanilide or, perhaps, *o*-phenylphenate.

Other sellers of plastic starch include B. T. Babbitt, which sells Dura Plastic on the West Coast, and Texize, which sells a plastic starch in the South.

CMC—Steady Sales: Liquid starches based on CMC (carboxymethyl cellulose) get about 5% of the over-all starch dollar—a position that hasn't changed appreciably in several years. Though CMC starch makers' chief sales angle is that their product will not leave streaks on colored material, the public hasn't been interested enough to drive sales of these products very high. Price, of course, has been a factor in depressing sales. With starch-grade CMC at 55-60¢/lb., it's necessary to sell CMC starches for around 33¢/qt. Although this is considerably under the 59-69¢/qt. price for plastic starch (good for 10 washings), the CMC starchings last only until washed, cost twice as much as vegetable starches.

Among the makers of CMC starches, probably the two biggest are Tidy House Products (Shenandoah, Ia.), which makes Glosstex, and Texize Chemicals. Both companies market the CMC starches in two forms, a white opaque and a transparent product. Tidy distributes its products in a 26-state area from the Rockies east to Pennsylvania and north of the Ohio River. Texize sells in the South and Southwest.

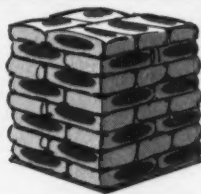
Prognosis: Whether makers of vegetable or plastic starches, almost all starch makers queried by CW admit that the wash-and-wear trend has hurt them. In general, all admit that the market is softening, that there's not much hope of stemming this decline of traditionally formulated products.

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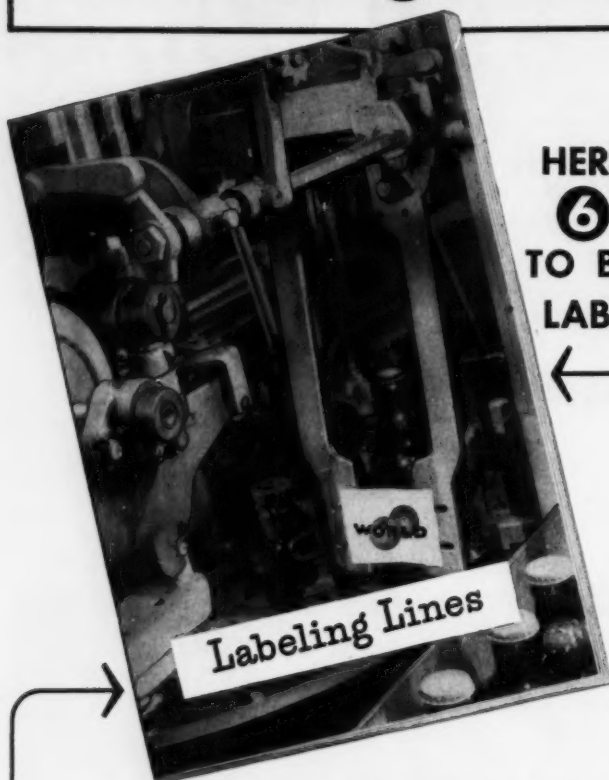
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SPECIALTIES

Twist to TBA Selling

Auto specialties makers may soon find enlarged outlets for their products in grocery stores and car-wash plants. Some grocery chains are going into the retail gasoline business by opening service stations adjacent to supermarkets. For example, Food Fair, which has 368 stores, is now building four stations in Philadelphia that will carry Food Fair's brand of gas as well as antifreeze and motor oil. The chain will continue to stock auto polishes and waxes in its grocery areas, but these specialties will not be available initially in the gasoline stations.

Grand Union, which has 472 stores, is said to have similar plans; the chains are watching the success of Food Fair's experiment.

Although auto specialties are now sold in some grocery stores, the service station-food store combination appears to offer increased opportunities for private-brand makers, as well as for companies making auto products unsuitable for grocery store shelves because of size, flammability, price, etc.

Another outlet that may blossom in the next two or three years is the expanded automatic car-wash unit. Operators of these units are making greater efforts these days to sell touch-up paints, polishes, waxes, tires, batteries and other accessories (called the TBA line). An estimated 1 million motorists walk through car-wash plants daily while their cars are scrubbed. Operators figure that they can capitalize on this "captive audience."

PRODUCTS

Crimping Machine: Aerosol Machinery Co. (80 Magnolia Ave., Westbury, L.I., N.Y.) now offers a hand-operated crimping machine for aerosol units. The machine weighs 35 lbs., needs no additional source of power, has a keyway-guided head that maintains the central position of the crimping jaws throughout all changes of container height.

Enameling Process: Chas. Pfizer & Co., Inc. (New York), will next month introduce a direct porcelain enameling system adaptable to existing plant facilities. It's called the Ray-Davis Process, uses citric acid in the pickle bath instead of sulfuric acid, enabling the cover coat enamel to be applied directly to the steel.



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In the few short years since it was introduced, Neville LX-685 has been employed with evident success in the preparation of an ever expanding group of products. A partial list of the uses for this versatile resin is on the right. If one of these applications is related to your product line, and you are not using LX-685, it might well pay you to write for literature or ask us for a sample. The Neville Technical Service Laboratory developed many of the present successful uses . . . perhaps it could help you too.

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Please send information on LX-685.

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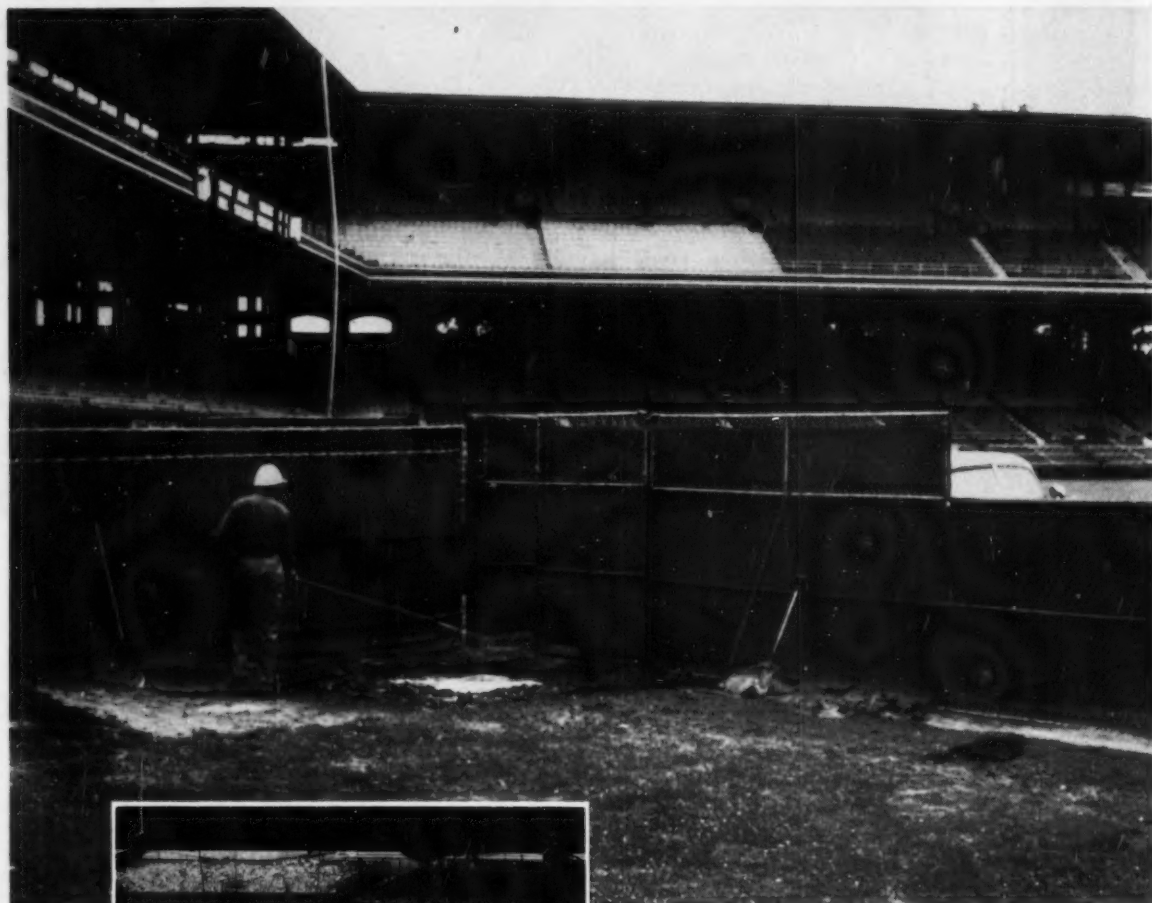
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STATE

Surface filming properties of **Fatty Nitrogen*** Chemicals may improve your product or process!

Aliquat® H-226 used to stabilize and waterproof soil at Comiskey Park—home of the Champion Chicago White Sox



▲ Soil stabilization projects such as Comiskey Park's bullpen can be accomplished by spraying on water dispersible Aliquat H-226. Continuing test programs on highways and roads indicate that Fatty Nitrogen Chemicals stabilize and waterproof clay soil.

◀ The American League Champion Chicago White Sox scored another "first" when their ball park was used to demonstrate the soil stabilization properties of General Mills' Fatty Nitrogen Chemicals.

Chemistry of Soil Stabilization with Aliquat H-226

Aliquat H-226—dihydrogenated tallow dimethyl ammonium chloride has shown excellent promise as an effective soil stabilization chemical. The cationic nature of Aliquat H-226 enables it to complex with many types of clay soils. The complex is formed when the large organic cation of the quaternary ammonium salt exchanges with metallic cations on the surface of the clay particle, altering its surface characteristics. This change in the treated soil is due to surface filming or the formation of a hydrophobic film on the surface of each clay particle.

Tests show that soil treated with Aliquat H-226 maintains near constant physical properties under abnormal moisture conditions.

General Mills' Fatty Nitrogen Chemicals offer opportunities for soil stabilization where excess moisture affects the physical properties of soil—lowering of strength, swelling and mucking. The Aliquats are ideal because of their ease of application, safety in handling and surface filming effectiveness at low levels.

Major Application Areas for Fatty Nitrogen Chemicals

Many other industries are benefiting from the surface filming properties of General Mills' Fatty Nitrogen Chemicals. Products or processes that successfully use them today include mining (ore flotation) textiles (fabric softening) petroleum (corrosion inhibition and fuel stabilization) agricultural (clay and talc modification) and pharmaceutical (chemical extraction).

Surface filming and other key properties of the Fatty Nitrogen Chemicals indicate a place for these products in your industry.

For more information about General Mills Fatty Nitrogen Products or a call from one of our technical representatives, write CW 10 Chemical Division, General Mills, Kankakee, Illinois.

* Fatty Nitrogen Chemicals



Above left, fatty primary amine; above right, fatty secondary amine; center, fatty diamine; lower left, fatty tertiary amine; lower right, fatty quaternary ammonium chloride.

These General Mills high quality Fatty Nitrogen Chemicals are reactive organic compounds, derived from fatty acids of varying molecular weights and different degrees of unsaturation. The alkyl chain linearity of the parent fatty acids is carried over to the Fatty Nitrogen derivatives.

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- ✓ **SURFACE FILMING**—Fatty nitrogen derivatives adsorb on metal as a monomolecular film and protect the metal from corrosive environment.
- ✓ **SELECTIVE ADSORPTION**—Fatty amines preferentially adsorb on certain nonmetallic mineral surfaces; this surface modification enables the separation of ore components.
- ✓ **CHEMICAL REACTIVITY**—The fatty nitrogen derivatives are unique building blocks for organic chemical synthesis.
- ✓ **SOLUBILITY**—The fatty nitrogen derivatives have characteristic solubilities in a wide variety of polar and nonpolar solvents.
- ✓ **SURFACE ACTIVITY**—The fatty nitrogen derivatives are cationic emulsifiers, wetting agents and detergents.
- ✓ **BIOCIDAL ACTIVITY**—The fatty nitrogen derivatives are effective against certain bacteria, fungi and algae.
- ✓ **BASE EXCHANGE**—The fatty nitrogen derivatives can replace inorganic ions in clays to make the clays compatible with organic liquids.
- ✓ **LUBRICITY**—Fatty nitrogen derivatives, electrochemically adsorbed on fibers and fabrics, lubricate the individual fibers and confer softness.

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October 24, 1959 • Chemical Week



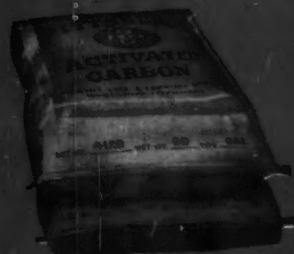
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ADMINISTRATION

How Recession Pinched the Chiefs' Pay

Chief executives of chemical companies emerged from the '58 recession with minimum pay gains and some pay cuts. Changes in income more closely paralleled changes in sales than declines in profits. Those are the highlights of CW's third annual analysis of executive compensation rates in the chemical process industries.

Under analysis were 34 companies' reports to the Securities & Exchange Commission. These companies had sales of about \$9 billion, about 40% of the chemical industry's total sales, and represented a drop of 4.9% from '57 for those firms; net profits sagged 12.7%. Of the 34 companies, 11 showed increases in sales and 23 had decreases; eight registered gains in profits and 26 showed less profits than in '57.

Generally, total compensation to chief executives of these firms followed the sales curve, as it has in the past two years (*CW*, Sept. 6, '58, p. 39; Sept. 7, '57, p. 47). Company presidents' compensation, including deferred income and bonuses, was at a rate 3.7% lower than in '57. About 38% of them got raises, 38% had pay cuts. Compensation of 24% stayed the same.

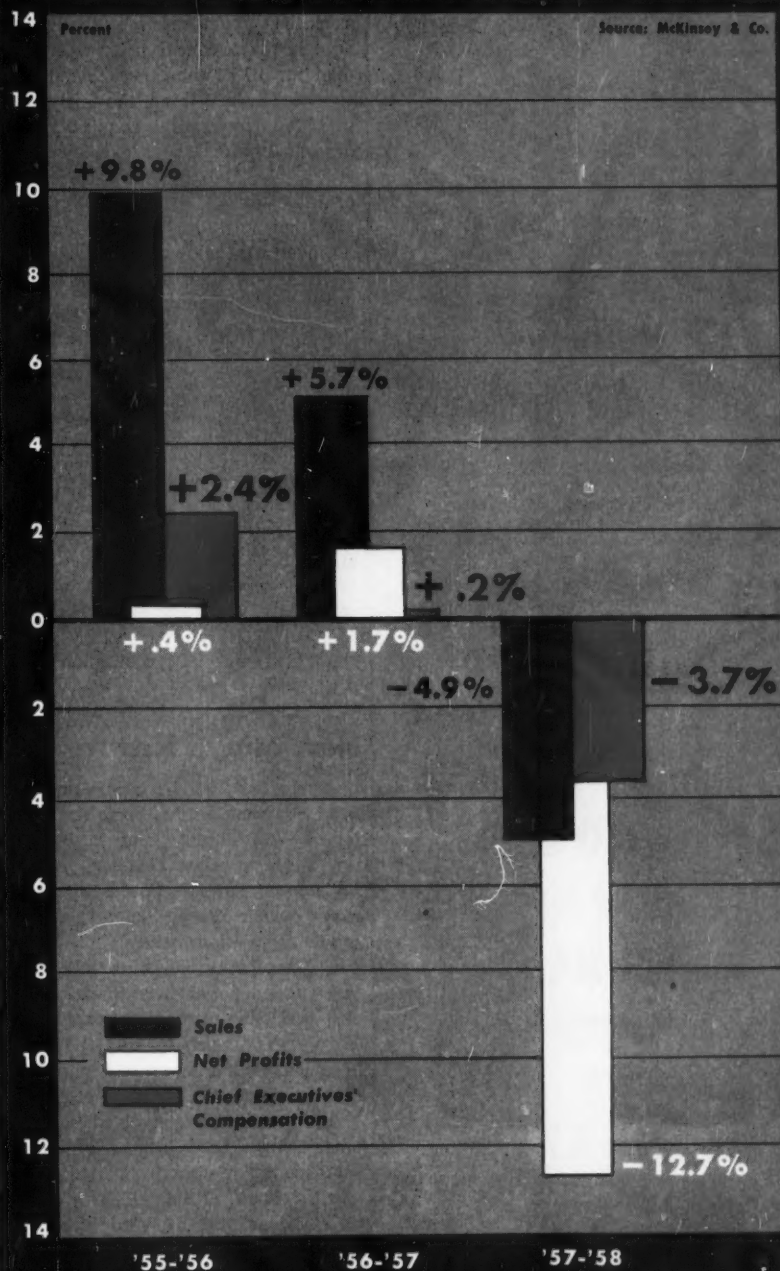
In all industries, where the average drop in sales and profits was only slightly less than that of the chemical group, 39% of top executives got raises and 34% took a cut, with compensation of 27% remaining the same. This analysis came from records of 791 publicly owned companies, and was made by the management consulting firm of McKinsey & Co. (New York).

Lower Echelons: The relationship of compensation of vice-presidents and lower-bracket executives to that of the chief executives remained about the same as in '57. Second-echelon executives in the chemical industry earned about 71% of the chief executives' compensation; third and fourth echelons ranked 64% and 61%, respectively. In all industries, the second, third and fourth highest-ranking executives received 73%, 60% and 55% of the top executives' total compensation.

Compensation to the top chemical

Presidents' Pay Follows Sales Patterns

38 chemical company chief executives took pay cuts as sales dropped in '58



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MANGANESE SULFATE
MANGANOUS OXIDE
MONOHYDRATED
MANGANESE SULFATE

ADMINISTRATION

executives increases more rapidly in relation to sales volume increases than it does in other industries. The average compensation to presidents in the chemical companies with \$50-million/year sales ranked 12th among the 23 total industry groups studied. In firms with \$500-million/year sales, it ranked eighth; and at the \$1-billion level, seventh.

Several factors other than size probably influence the level of chief executives' compensation. The variance in the chemical group is greater than for 10 of the other 23 industry groups. For one thing, the fairly high rate of mergers and acquisitions in the industry dislocates executive salaries. Other factors: the marked decentralization of chemical companies; also, their fairly high degree of return on investment allows higher wage and salary scales, compared with those of most other businesses.

CPI Results: For five of the chemical process industries, including chemicals, paper, petroleum and natural gas, nonferrous metals, and rubber, the trend of compensation-following-sales holds true. In the combined totals for these groups, profits were down 17.8%, sales were down 0.6%, while chief executives' compensation dropped 1.62% from '57 to '58. One slight exception was the petroleum and natural gas industry, where profits dropped 19.9%, sales rose 1.13%, and chief executives' compensation rose 0.385%.

New Life at Nitro

As major flood-control projects near completion, the Kanawha Valley of West Virginia is again drawing interest as a prime chemical-producing region. Latest action is by Monsanto, which has just completed real estate negotiations with Nitro Industrial Corp. and will now take over 700 acres of industrial, commercial and residential property near Nitro, W. Va. The tracts include 180 acres of vacant land adjacent to Monsanto's 58-acre plant site.

The transaction involved an exchange of 27,675 shares of Monsanto common stock, estimated to be worth about \$1,350,000, for NIC stock. Monsanto's Howard Minckler, Organic Chemicals Division director of manufacturing, said that major expansion is planned for the site.

Monsanto in the last two years has been adding to its plant with a major distillation unit for tall oil, and a unit to make fortified rosin size for paper.

Not Alone: Other firms are also making long-range plans for the area. Since '56, for example, an estimated \$56 million has been plowed into modernization and expansion programs by Du Pont. This summer, Union Carbide moved research and development staffs into a \$10-million technical center at South Charleston. Food Machinery and Chemical Corp. and Du Pont expect to complete modernization programs in early '60.

Renewed interest in the valley, which became a large chemical center in the '20s, is directly credited to the flood-control planning. Many of the prime plant sites above flood level are already held by major companies. But completion of the \$34.6-million Sutton Dam at the head of the Elk River tributary next spring and the projected \$50.8-million Summersville Dam on the Gauley River headwaters are expected to open the lower half of the 97-mile Kanawha River valley to industry. Some cleared tracts are held by such firms as Carbide, Du Pont, Diamond Alkali.

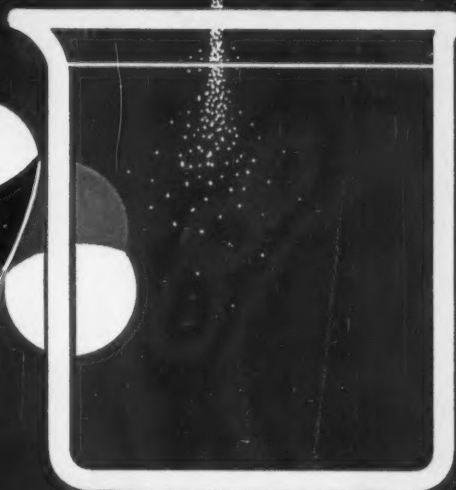
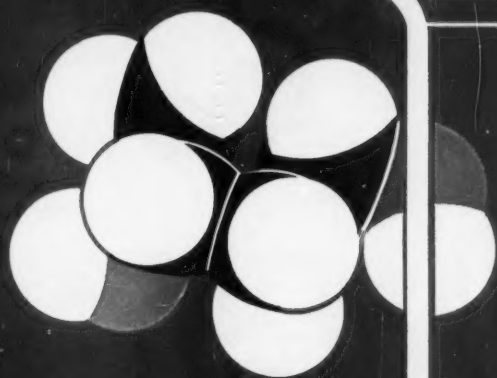
Dorman Miller, area development director for Appalachian Power Co. (Roanoke, Va.), says that "for a long time, a lot of the land held by major chemical companies has never been seriously considered" as plant sites. "Now, as flood control improves," he adds, "they're covering their bets on long-range expansion in the valley by taking a closer look at the 40-mile stretch west of St. Albans and Nitro, which had been considered 'questionable land' for industrial purposes."

LEGAL

Lease-Back Losses: A U.S. circuit court of appeals has handed down a tax case decision that may set a precedent of interest to chemical companies that use plants, warehouses or other buildings on a lease-back arrangement. The court ruled that a company may sell a building at a tax-deductible loss, then lease it back for more than the usual 30 years.

Boston department store Jordan Marsh went beyond the traditional 30-year lease period in contracting to lease back a building it sold at a \$2-

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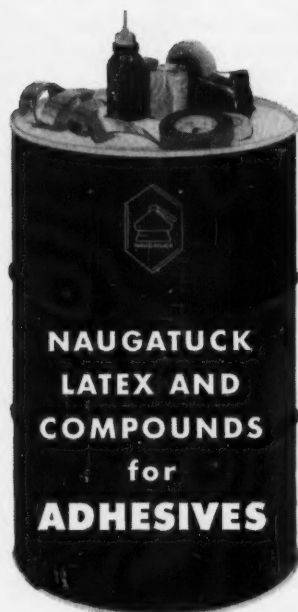


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NAUGATUCK CHEMICAL DIVISION

ADMINISTRATION

million tax-deductible loss, although Internal Revenue Service says that having a longer lease period is like owning the building again. The court ruled that there was nothing sacred about the 30-year figure, as long as the transaction was legal and in good faith. IRS is expected to appeal the case to the Supreme Court.

'Fair Trade' Law: The Upjohn Co. is defending Ohio's new "fair trade" law and its constitutionality in a demurrer to a case brought by five Cleveland stores against the pharmaceutical firm. Upjohn agrees that allegations are true but challenges the legality of the case. The company, which says it has "always been one of the leading supporters of fair trade," was the first manufacturer to announce that it would enter into minimum price contracts in Ohio.

Alabama Pollution: A new water-pollution bill before Alabama's legislature may put sharper teeth into the state's handling of water pollution. The bill, sponsored by the Warrior River Improvement Assn., would set up a reconstituted water improvement commission with enforcement powers, and would repeal three reportedly ineffectual laws. It would provide punitive powers, lacking in present legislation, and would eliminate "grandfather clauses" allowing offenders to continue practices started prior to current laws.

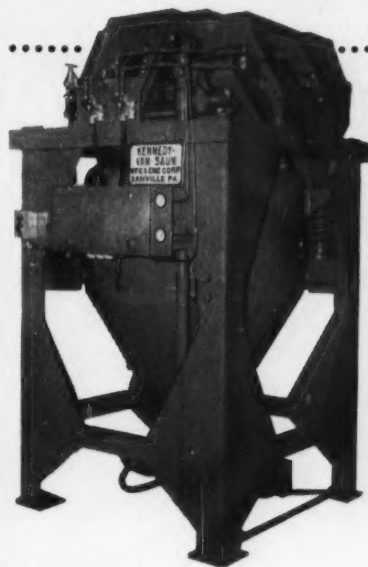
LABOR

Paper Strike: Bowaters Carolina Corp.'s giant new pulp mill near Catawba, S. C., in operation only three months, was shut down by 235 striking maintenance and production workers represented by the International Brotherhood of Pulp, Sulphite and Paper Mill Workers after contract negotiations broke down. The strike came on the eve of dedication of the new plant; ceremonies were postponed until settlement of the labor problem. At issue is the definition of maintenance jobs. The union wants such jobs set up on a craft basis.

Copper Hassle: Striking Mine, Mill and Smelter Workers have told Kennecott Copper Corp. management that its offer of a 5¢/hour wage increase is inadequate. The union speaks

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ADMINISTRATION

for about half of the 10,500 Kennecott employees on strike in Utah, Nevada, Arizona and New Mexico. Negotiations are still in progress.

Outside Contractors: Use of outside contractors was at the heart of a three-day strike by Local 825, International Union of Operating Engineers, against California Oil Co.'s Perth Amboy, N. J., plant. But it was terminated in accordance with a 30-day cooling-off period, while union and management negotiate terms of a new contract to replace a two-year contract that expired Sept. 30.

KEY CHANGES

Joseph G. Solari to vice-president, sales, Carbon Division, Great Lakes Carbon Corp. (New York).

Woodman Perine to chief executive, Refinery Engineering Co., division of Vitro Corp. of America (New York).

Harold Vagtborg to executive chairman, **Martin Goland** to president, Southwest Research Institute (San Antonio).

Laurance Bowen, Jr., to president, Pecora, Inc. (Garland, Tex.).

Frank W. Chambers to executive vice-president, Strategic Materials Corp. (Buffalo).

Jack W. Pratt and **Berne A. Schepman** to vice-presidents, Process Engineers Division, The Eimco Corp. (New York).

Bruce Ainsworth to assistant to the vice-president, Chemical Division, **Jay Quinn** to associate director of research, both of Wallace & Tiernan Inc. (Belleville, N.J.).

E. E. Smith to manager, Chemical Division, Climax Molybdenum Co. (New York).

W. H. Boyd to president and treasurer, **C. F. Olmstead** to vice-president, Gas Atmospheres, Inc. (Cleveland).

Ray H. Horton to president, Humble Division, Humble Oil & Refining Co. of Delaware.

Carl Blum to chairman of the board, **A. E. Woodley** to president, Dolphin Paint & Varnish Co. (Toledo).

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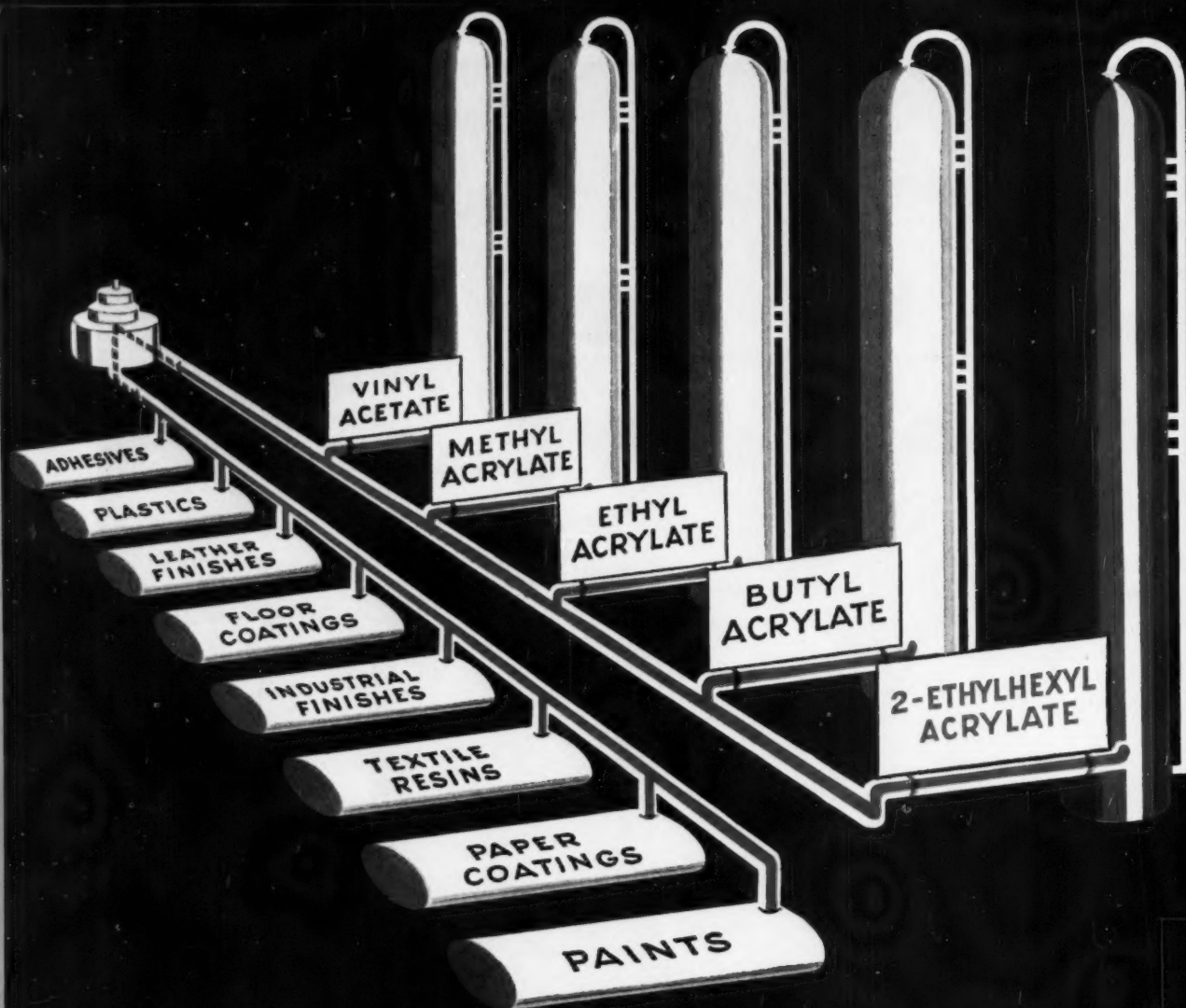
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Technology

Newsletter

CHEMICAL WEEK
October 24, 1959

Note these new adhesives for missiles, supersonic aircraft. Materials that retain 75-85% of strength after long exposure at 600 F were reported at last week's meeting of the American Society for Testing Materials in San Francisco. They combine resins (e.g., epoxies) with metallic oxides (e.g., 32-48% arsenic pentoxide), require three hours' curing at 600 F, followed by 24 hours' postcure at 500 F. Narmco Industries, Inc. (San Diego, Calif.), did the research under a U.S. Air Force contract.

A new lithium purification method may overcome corrosiveness at high temperatures, open the door to lithium's use as a high-temperature, high-performance coolant for nuclear reactors.

The process, developed at Oak Ridge National Laboratory (Oak Ridge, Tenn.), involves filtration of gas-packed (under argon) commercial lithium at 250 C, to remove "gross" amounts of nitrogen and oxygen contamination; gettering (e.g., with titanium sponge) at 800 C for 24 hours, to reduce nitrogen concentration to less than 100 ppm.; cold-trapping for about 100 hours, to reduce oxygen concentration to less than 100 ppm.

Oak Ridge researcher E. E. Hoffman tells *CW* the process is now being used to prepare small samples of pure lithium for corrosion studies. It's too early to say whether pure lithium has a big future, says Hoffman, explaining that there is a lot of interest in the metal but that its eventual use depends on the outcome of present studies.

Simplification of epoxy application techniques is promised as a result of a new Shell Chemical Corp. development revealed this week in Atlantic City, N.J., at the Paint Industries Show. The company has come up with two new curing agents—Epon curing agents H-1 and H-2—which allow spraying of 100%-solids epoxy coating with conventional spray equipment, eliminating need for complex metering and mixing devices. Use of the hardeners with solvent-type coating is said to provide a usable pot life of several weeks, compared with the one-day period available with previously used curing agents.

The first successful extrusion of pure chromium metal tubing is claimed by Nuclear Metals, Inc. (Concord, Mass.). Potential uses of the tubing are in rocket nozzles, jet tubes, and nuclear fuel elements. Union Carbide Metals Co. (New York), division of Union Carbide Corp., supplied the required chromium powder, which was cold-compacted into a mild steel container, heated, placed in a 1,000-ton press and extruded over a mandrel.

A new synthetically modified penicillin is being clinically evaluated by Chas. Pfizer & Co. The material, tradenamed Maxipen, is said to produce blood levels higher than any penicillin form now available.

Technology

Newsletter

(Continued)

A herbicide for wild oats is on the way from Spencer Chemical Co. The new material, called Carbyne, has been successfully tested in many of the 40 million infested acres in the U.S. and Canada. It will be on the market within a year. Chemically, it's 4-chloro-2-butyryl N-(3-chlorophenyl) carbamate, covered by Spencer's recent U.S. Patent 2,906,614. Estimated cost: \$3-5/acre.

Has the government's screening program turned up 25 new drugs that are promising enough to warrant study in humans? National Cancer Institute officials, queried by *CW*, say they have no information on the item, published in a major newspaper last week. NCI says it is now testing 109 compounds in humans—a figure that hasn't changed for several months.

Allis-Chalmers unveiled a new fuel cell last week in the first demonstration of a fuel-cell-powered vehicle—a farm tractor equipped with 112 nine-cell units, in place of the conventional gasoline engine. The power was derived from propane and oxygen (the company claims other hydrocarbons may also be used), developed a draw-bar pull of about 3,000 lbs.

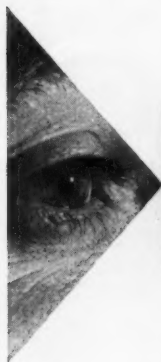
Key to operation of the new cell is a catalyst, name of which the firm hasn't disclosed. The cell also features the use of an electrolyte that's impregnated into the spacers between the current-carrying grids to eliminate problems of handling liquids. Present performance, says Allis-Chalmers, comes up to about 60% of theoretical efficiency, and 80% efficiency is believed to be obtainable. Cells operate at low pressure and are said to be extremely cheap to manufacture.

Pilot production of quercetin will be discontinued by Weyerhaeuser Timber Co. (Tacoma, Wash.). Although the compound (tetrahydroxyflavonol) has shown some promise in pharmaceuticals and antioxidants, no substantial markets have developed. However, Weyerhaeuser tells *CW* the move to stop production of the bark-derived intermediate doesn't mean it will give up its broad program of getting chemicals from wood.

First nuclear chain reaction has been produced in the Dresden, Ill., nuclear power station, the country's first full-scale, privately financed atomic power plant. Initial fissioning is the primary step in the reactor testing program that will lead to production of electricity early next year. Several months of power testing are planned before the station goes into full operation in mid-'60, about six months ahead of the original schedule.

General Electric is developing the \$45-million, 180,000-kw. nuclear plant for Commonwealth Edison.

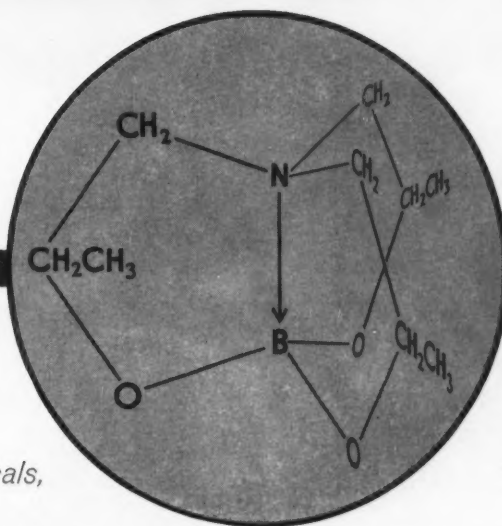
Union Carbide Chemicals' big technical center officially opened at South Charleston, W. Va., this week. It brings together the division's research, development, and engineering departments on a 412-acre site that allows for future expansion.



TRI-ISOPROPANOLAMINE BORATE

BORESTER® Boric Acid Ester #21

Researchers! Take a close look here.....



*a white crystalline solid,
like lots of other boron chemicals,
but different in one big way...*

boron-nitrogen interaction makes the difference!



TECHNICAL DATA

MOLECULAR WEIGHT..... 199
% BORON..... 5.44
MELTING POINT..... 153-156°C
BULK DENSITY..... 4.82 lb./gal.
SOLUBILITY: Soluble in water,
acetone, chloroform, benzene.

This new and interesting boric acid ester is quite worthy of your evaluation. TRI-ISOPROPANOLAMINE BORATE is different from all other borate esters—it is soluble in water, and is stable indefinitely in water solution. Hydrolytic stability is now available in borate esters! Potential uses might well be: *acid scavenger, epoxy catalyst, and organic intermediate.* Other uses may occur to you as you explore the boron and amine catalytic properties of this ester—one of the many new boron chemicals coming from our laboratory facilities at Anaheim—which is now available in pilot quantities. Write for samples and ask for TECHNICAL DATA SHEET #21/OB.

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U. S. Borax Research Corporation



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Chemical Pumps



NEED ONE PUMP THAT CAN HANDLE ALL THESE CHEMICALS?

The cheapest pump to buy isn't always the cheapest pump to own. To handle each of the above chemicals you could specify a pump made of the *least expensive* material. You could end up with pumps built of four or five different grades of stainless steel.

Advantages of Worthite

Or you could have specified Worthite* for all applications . . . at a cost of just a few percent more. These few additional dollars could mean major savings in plant operations. By standardizing on Worthite, you get flexibility to make changes in the process without running up against more corrosive liquids than your pumps can handle. And

Worthite would make each of your pumps a lot more resistant to corrosion.

Worthite is a high-nickel, high-chromium, low-carbon alloy steel that contains nearly twice as much alloying material as standard stainless steel, but costs just a few pennies more per pound.

Quantity Buying

What's the reason for Worthite's low price? By standardizing on this one alloy and by quantity buying and production, Worthington has made its price competitive with ordinary stainless steel.

If you want the maximum in corrosion protection plus the most flexibility in

your chemical pumps, ask your nearest Worthington representative about the advantages of Worthite. Or see Worthington's insert in Chemical Engineering Catalog. Worthington Corporation, Harrison, N. J. In Canada, Worthington (Canada), Brantford, Ont.

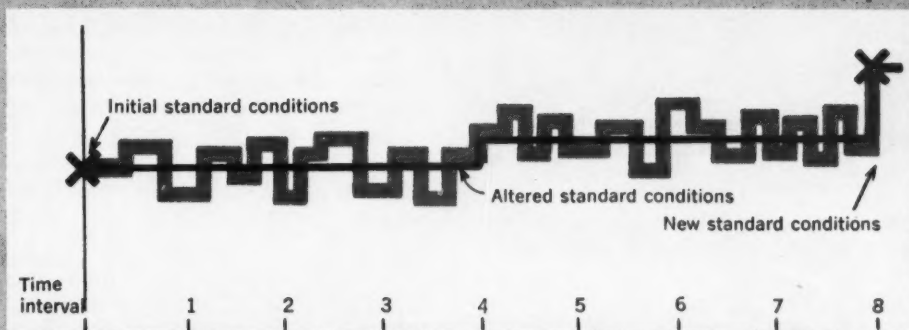
*Trademark Reg. U. S. Pat. Off. 20-8



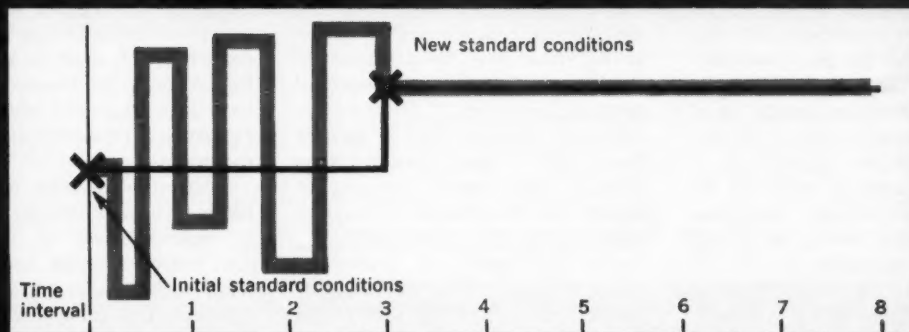
PRODUCTION

Evolutionary Operation vs. Crash Program

Comparing two extreme methods for improving plant processes



When product is on quality borderline, EVOP achieves improvement by GRADUALLY altering conditions. No extra cost or extra manpower outlay is required by EVOP.



When product is unacceptable, crash program improves quality by DRASTICALLY altering conditions. Crash program calls for additional crew, extra expense.

Turning Minor Changes into Major Savings

The comparison above shows some of the reasons why nearly 100 engineers traveled to St. Louis last week for a two-day training course in "evolutionary operation" cosponsored by the American Society for Quality Control's Chemical Division and its St. Louis section.

Evolutionary operation is a technique that permits the plant operator to run process improvement "experiments" without tampering with the product or production.

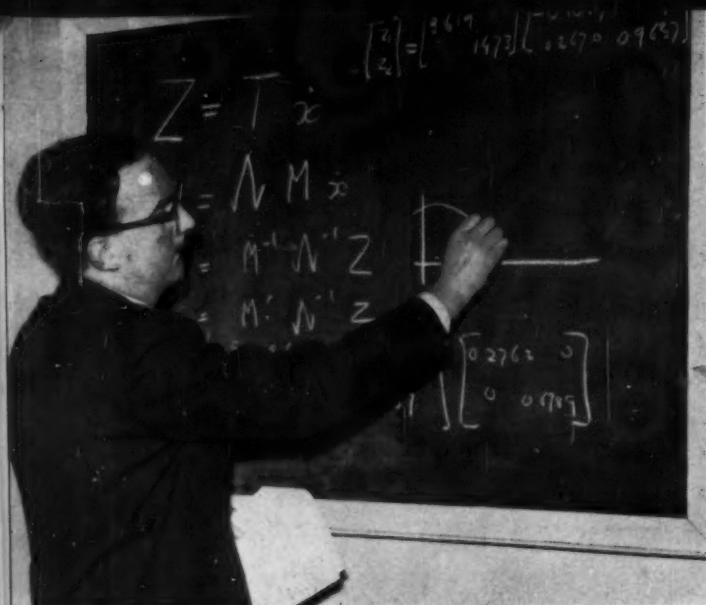
First course in the technique, developed by George Box and K. B. Wilson several years ago in England,

was given for industry in June '58 at Newark, N.J. Since then, the American Society for Quality Control has put on programs at St. Paul, Minn., Detroit and Rochester, N.Y. But the St. Louis course, which attracted engineers from many areas of the country, is the best indication, according to Felix Williams, Monsanto Chemical's vice-president of manufacturing, that EVOP is "growing on a national scale."

What makes EVOP so attractive is this: it is a method of day-by-day plant operation that permits a company to get the most out of a process

quickly. It can be made a permanent part of operating procedure because it doesn't upset product quality and yield. And, it doesn't add to plant costs or require the assistance of technical personnel from research or development departments.

That's why George Box avoids the word "experiment" when discussing the technique. Experiments are usually conducted in the laboratory and pilot plant. If they are carried out in the plant as a crash program, they disrupt normal production, add to cost, require the close supervision of research and develop-



George Box of Princeton (in photo) and J. Stuart Hunter of U. S. Army's Math Research Center (at the University of Wisconsin) have simplified EVOP's statistical evaluation to routine calculations that can be performed by nontechnical plant operators.

ment personnel. And, they usually turn out some product that is off specification, unusable.

Small Change: In the EVOP technique, minor changes in key process variables are systematically and continuously made by the production department. The changes are so slight they produce results (e.g., changes in quality, yield, cost) that are difficult for the untrained eye to separate from changes caused by the minor random variations that constantly take place during the normal course of any operation.

Nevertheless, the training needed to detect the results of the systematic changes is simple. The St. Louis course was given by two disciples of Box, J. Stuart Hunter of the U.S. Army's Mathematical Research Center at the University of Wisconsin and Truman Koehler, supervisor of statistical analysis at American Cyanamid's Bound Brook, N.J., plant. It took two days. In-plant training for nontechnical plant operators can be given in one day. Only simple mathematics is needed to make EVOP work. Here's how it's done:

If it is decided to find out what will happen to the cost of a product by varying reaction temperature and concentration of the process feed stream, temperatures and concentrations very close to the standard operating conditions are picked. For example, if standard operating conditions are 200 F and 62% feed concentration, temperatures four degrees higher and lower and concentrations that are 2% higher and lower might

be chosen. This means that four new operating conditions are set up: one at 204 F and 64% concentration, another at 204 F and 60%, etc.

If the process is a batch operation, the operator runs a series of batches at the four new operating conditions as well as at the standard operating conditions. If the process is continuous, it is operated at each of the conditions for a specified time interval—time being allowed, of course, for the process to stabilize itself at each set of conditions.

After a number of rounds—or cycles—of operation, the costs of product are averaged for each of the five conditions. If there is no difference in product cost between the operating conditions, new operating conditions with slightly wider temperature and concentration spreads can be safely set and the trials repeated.

But if there are small differences between the average product costs, a simple subtraction tells how much can be saved (or possibly added to present product cost) by changing temperature or concentration. But these cost figures are subject to error because of the possibility of random process changes. Therefore, simple statistical analysis must be used to determine the percentage error and whether the cost figures obtained by systematic changes are significant.

Box and Hunter have developed a simple calculation procedure for determining this error, judging the significance of the difference between the averages. This procedure, reported in *Technometrics*,* Feb. '59, in "Con-

densed Calculations for Evolutionary Operation Programs," reduces the calculations to a simple routine that can be performed by plant operators.

Continuing Program: When evaluation shows that a change in operating conditions will result in an operating improvement, the standard operating conditions are altered and the EVOP evaluation is repeated around the new conditions.

While it often takes many weeks before enough information is obtained to make changes in the process (i.e., random changes have averaged out, become smaller and smaller, and systematic changes appear significant), the time interval between process improvements is shorter than it would be by finding the best operating conditions through natural evolution. "You can make the discovery this year rather than in five or 10 years," is the way Box puts it.

Of course, EVOP results are obtained more slowly than if a crash program of plant experimentation were used. "But if a process is really sick, you'd have to use a crash program to get it back on its feet anyway," says Koehler. EVOP is suited to processes that are "only slightly ill," he adds.

Or, as Box puts it: "You may think you are operating the process the best way. But if you aren't absolutely sure, EVOP will help you to make sure."

Chain Effect: Monsanto's Williams says that EVOP seems to have a chain effect—if you use it for one process,

* A statistical journal sponsored by the American Statistical Assn. and the American Society for Quality Control and edited by Hunter.

	DYTOL A-24 (lauryl)	DYTOL B-35 (lauryl)	DYTOL J-68 (lauryl)	DYTOL L-79 (lauryl)	DYTOL E-46 (cetyl-stearyl)	DYTOL F-11 (cetyl)
Decyl C ₁₀	1.5%	1.5%	1.0%	none	none	none
Lauryl C ₁₂	71.0	60.0	82.0	98.0%	none	none
Myristyl C ₁₄	27.0	25.0	17.0	2.0	1.2%	1.0%
Cetyl C ₁₆	0.5	13.0	none	none	34.0	97.0
Stearyl C ₁₈	none	0.5	none	none	64.8	2.0

Typical alcohol compositions as determined by fractional distillation

Pick the Fatty Alcohol composition you need

Do you use fatty alcohols?—Then look at this wide range of compositions. It offers you a choice of the fatty alcohol mixture which will meet your needs best. Note that two of them are offered in assays that approach the specifications of pure chemicals—DYTOL L-79, 98% lauryl; and DYTOL F-11, 97% cetyl.

DYTOL fatty alcohols undergo typical alcohol reactions—they may be ethoxylated, sulfated, esterified, halogenated, and dehydrated. They may be oxidized to aldehydes or carboxylic acids. DYTOL fatty alcohols can be used as anti-foaming agents and emulsifying agents. When added to water reservoirs, DYTOL F-11 forms a monomolecular film which is an effective evaporation retardant. Also, DYTOL alcohols have possibilities as chemical intermediates in the syntheses of surface-active agents, cosmetic cream

additives, polymerization regulators for rubber and plastics, textile finishing and softening agents, detergents for lubricating oils, and quaternary ammonium compounds for pharmaceuticals. Write to Dept. SP-7 for further information on these fatty alcohols.

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Chemicals for Industry

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COMPANY**

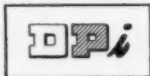
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PRODUCTION

it's sure to give you ideas for other processes. Koehler says Cyanamid is using it in more than 20 processes.

Williams, like many others, says EVOP is something that many companies have been doing for years—usually under the name of statistical quality control. But the statistical quality control lacked the formality of EVOP, he notes.

Koehler points out the one big difference: the plant production people, instead of statisticians and researchers, run the program. The usual procedure is to set up a committee that meets periodically, decides where EVOP should be used and what process conditions should be varied. But Hunter warns that EVOP is a production tool, that only production groups should control the plant program.

Process Poker: Box gives some other advantages of EVOP. Because the plant operators are a key part of the program, actually make calculations, their interest is stimulated. "It's like playing poker. Analysis of the trial operating conditions tell you whether you should stick with your present hand or discard it and play a new hand. Some operators will get so interested they'll even make side bets on how runs will turn out," says Box.

He adds that many operators, their interest stimulated, find they can keep operating conditions within stricter limits. They can no longer take operating shortcuts because they have to vary operating conditions at specified time intervals or with different batches.

The companies most familiar with EVOP are those like Imperial Chemical Industries, American Cyanamid and Chemstrand, that have had personal contact with Box. It began at ICI, where Box was a chemist. ICI has used EVOP in regular plant operations since '54. When Box moved to Princeton in '56, he and Hunter, acting as consultants, helped its rapid adoption by Cyanamid, Chemstrand, and a few others.

"It's really old-fashioned to run a plant to get product only. It should be run to get information about the process that will lead to improved quality," says Box. Judging from the interest shown at the St. Louis training course, many chemical companies are out to learn just how old-fashioned they are, give evolutionary operation a try at bringing them up to date.

Foremen's Pay Viewed

The best paid foremen in the chemical industry work in the South and the West. This and other facts about foremen's salaries were turned up recently in a nationwide survey conducted by Vision, Inc.'s (New York) Employee Relations Bulletin.

The average foreman's salary in all industries is \$556/month. But it's higher for foremen in companies manufacturing durable goods — \$562/month—than for those in companies supplying nondurable items—\$549/month. Of the 1,418 companies with 33,373 production foremen surveyed, those west of the Mississippi pay highest salaries, those in the South the lowest.

But in the chemical industry, where foremen's average pay is \$562/month, those in the South receive second highest pay, are topped only by those in the West. The chemical industry figures given to *CW* by Vision: \$588/month west of the Mississippi; \$569/month in the South; \$562/month in the Mid-Atlantic states; \$543/month in the Midwest; \$496/month in New England.

EQUIPMENT

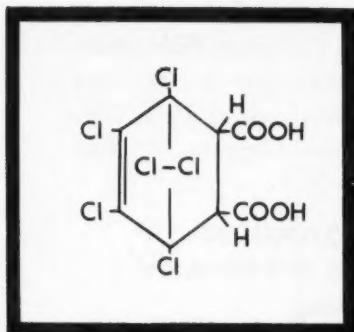
Gear Pump: Eco Engineering Co.'s (12 New York Ave., Newark, N.J.) Gearchem pump is now available in electrolytically pure nickel to prevent contamination of bromine and caustics. Casings and shafts are nickel; driving gears are nickel or Hastelloy, and idler gears are Teflon. Pumps have capacities to 10 gpm.; operating pressures to 100 psi. Flows have metering accuracy of $\pm 1\%$.

Eco is also offering a new Gear-Vac valve for viscous fluids, such as heavy greases, plastisols, polyesters and acrylic resins. The valve has standard 150-lb. ASME 3-in. flange on suction side, $\frac{3}{4}$ -in. threaded discharge port.

Combination Burner: Peabody Engineering Corp. (232 Madison Ave., New York 16) is out with a new fuel burner that can be used for separate or simultaneous oil and gas firing of process furnaces. The natural draft unit, called Flexipro burner, can be used for vertical or horizontal firing at capacities from 2 to 16 million Btu./hour.

BRIEFS

on a highly chlorinated new intermediate... some phosphorus chemicals for igniting... new booklet on benzoic acid and sodium benzoate... an exhaustive chlorine manual



New intermediate is 54.7% stable chlorine

This is Het® Acid, also known as chlorendic acid. It is a versatile intermediate which undergoes typical dibasic acid reaction.

It's 99.5% pure in the form of fine, white crystals. The stable, high chlorine content makes it exceptionally useful for imparting flame retardance to various derivatives.

Forms salts with a variety of metals. Both mono- and di- sodium salts are easily formed.

Forms esters by the usual methods to produce dimethyl, diethyl, dipropyl, etc. Rate of esterification is quite rapid.

Forms anhydride by dehydration at high temperatures.

Forms amines and amides.

Forms resins with glycols and other polyols and with fatty oils to make flame-retardant oil-modified alkyds.

These are just a few of Het Acid's reactions which have commercial interest. For a cursory glance at the whole story send the coupon for technical data sheet or, if you'd like to go into this even deeper, send for our Bulletin 40.

Some things have to burn

Got a product you want to ignite in air—like a firecracker, or a match, or a fuse, or a signal flare?

We make two different chemicals that will help get it started: red phosphorus and phosphorus sesqui-



sulfide.

The red phosphorus is 99.4% pure and ignites in air at 200°C. The particle size is 99% min through 100 mesh.

The phosphorus sesquisulfide is a lemon yellow compound completely free of untrapped phosphorus. It ignites by friction. 90% goes through an 80 mesh screen. 80% goes through 100 mesh.

Technical data on both compounds offered in the coupon.

New booklet on benzoic acid and sodium benzoate



If you would like facts on these two chemical cousins in one compact little booklet, check the coupon for Bulletin 323.

It's chock full of useful data on both Hooker chemicals in both their U. S. P. and Technical Grades.

Free Chlorine manual

If you'd like 76 pages of facts on chlorine, send the coupon for Bulletin 125.

There's a lot of information on the chemical itself, including charts and graphs on its physical properties.

There's lots more on how to handle chlorine safely. Descriptions of equipment and containers should make it easier to run a safe chlorine handling program.

Finally, there is a listing of the advantages you enjoy as a user of Hooker chlorine. Dependable delivery, in scrupulously clean containers, is the important one. But there are many others.



For more information check here and mail with your name, title, company, and address.

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CARBIDE solvents save you money... improve formulations...balance inventories...

The wide choice of CARBIDE solvents—esters, ketones, alcohols and glycol ethers—means you can take advantage of blending to obtain the best balance between cost and performance. But the biggest advantage to you is money saved by ordering compartment tank car or tank wagon shipments compared with drum lots. *Estimate for yourself, at a few cents a pound, how much CARBIDE solvents can save your company.*

Raw material inventories can be balanced—because fast shipments of the exact quantities you need are made from CARBIDE's plants, bulk stations, and 52 warehouses.

If you are evaluating solvents to improve your

formulations and lower your costs be sure and talk to a CARBIDE Technical Representative. Write for a copy of CARBIDE's "Solvent Selector." This valuable reference lists 69 solvents, couplers, and diluents, as well as a number of plasticizers. It gives evaporation rates, viscosities, flash points, bluish resistance, and other data in convenient tabular form. Write for a copy to Dept. HW, Union Carbide Chemicals Company, 30 East 42nd St., New York 17, N. Y.

UNION CARBIDE CHEMICALS COMPANY

DIVISION OF  CORPORATION

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Market Newsletter

CHEMICAL WEEK
October 24, 1959

A critical shortage of phthalate esters is the latest result of the steel strike. Producers say they are now allocating supplies on a 40%-of-contract basis; spot buying of phthalic anhydride is reportedly "impossible."

Hardest hit by the ester shortage are vinyl plastic calendering firms. Some observers assert that some big calendering firms may go bankrupt if the strike lasts much longer. In the emergency, some have switched to substitutes such as octyl diphenyl phosphate, TCP, adipate and sebacate esters. But such a switch is likely to only be temporary. Few will make a permanent change. Meanwhile, phthalate esters will likely be short for at least five weeks after the steel strike ends.

Although some European phthalic anhydride is coming in, buyers are grumbling about its generally low quality; it's reportedly causing all kinds of production problems—much phthalic must be recycled before sale.

The predicted use of lower-grade silicon in electronic applications (*CW*, Oct. 10, p. 65) this week gets a nod of approval from a West Coast semiconductor maker.

Robert Noyce, vice-president of Fairchild Semiconductor Corp. (Mountain View, Calif.), tells *CW* he "agrees wholeheartedly" with Aries Associates that the trend is toward use of less expensive silicon. To substantiate the point, Noyce reveals that use of Grade 3 silicon—instead of Grade 1—in all Fairchild semiconductor operations is resulting in sizable savings.

Japanese exports of semiconductor products to the U.S., says Noyce, do not yet affect Fairchild's business. Reason: Japanese products are going into consumer markets, whereas Fairchild transistors are aimed at military outlets—an area invulnerable to Japanese competition.

However, Fairchild plans to concentrate on computer business, hopes to beat out the Japanese through "technological superiority."

Fairchild Semiconductor has become a wholly owned subsidiary of Fairchild Camera and Instrument Corp., which last week revealed it had exercised an option to acquire 100% of Fairchild Semiconductor's common stock.

Fairchild Semiconductor—organized two years ago "on borrowed capital and a borrowed name"—expects sales of "about \$30 million by the end of '60."

The U.S. Budget Bureau is eyeing organic chemical statistics put out by the Tariff Commission and may recommend that the job be done by Bureau of Census.

Market

Newsletter

(Continued)

Such a transfer (a decision isn't likely for several months) could result in trimming of data from the annual summary of organic chemical sales and production, perhaps from monthly reports as well. Since the Budget Bureau, in addition, must approve any legislative request of a government agency, it could bar the Tariff Commission from requesting Congress to authorize continuation of the series (see also *Viewpoint*, p. 101).

Most CPI market researchers will likely decry removal of reporting on organic chemicals from Tariff jurisdiction—although many other industries, including inorganic chemicals and fats and oils, are already handled by the Bureau of Census. Reason: the Tariff Commission's current reports are more thorough than those done by Census; breakdowns are finer, names and addresses of producers are listed. The Budget Bureau's dour response: unwarranted subsidy to the chemical industry.

The proposed change would probably require adjusting of statistical tables to conform with Census methods, which list chemicals by product categories—Tariff lists them by companies. Efficiency is another factor in the debate; mailing costs could be trimmed because both bureaus poll the same companies for data on different types of products.

U.S. plastics output will reach 115 billion lbs./year by the year 2000. That's the "conservative" estimate made by Russell Weigel, president of The Society of the Plastics Industry, at the society's first national technical conference held in Los Angeles last week.

At the same session, Albert Forster of Hercules Powder predicted that the West Coast plastics industry will double in size within 10 years—to annual sales exceeding \$500 million.

U.S. plastics producers can't ignore Russia's challenge if they expect to compete for world markets, warns William Cruse, SPI's executive vice-president. Cruse recently toured Russia with other U.S. plastics experts and says the U.S.S.R.'s total plastics output—536 million lbs./year—includes "everything we make except polyethylenes."

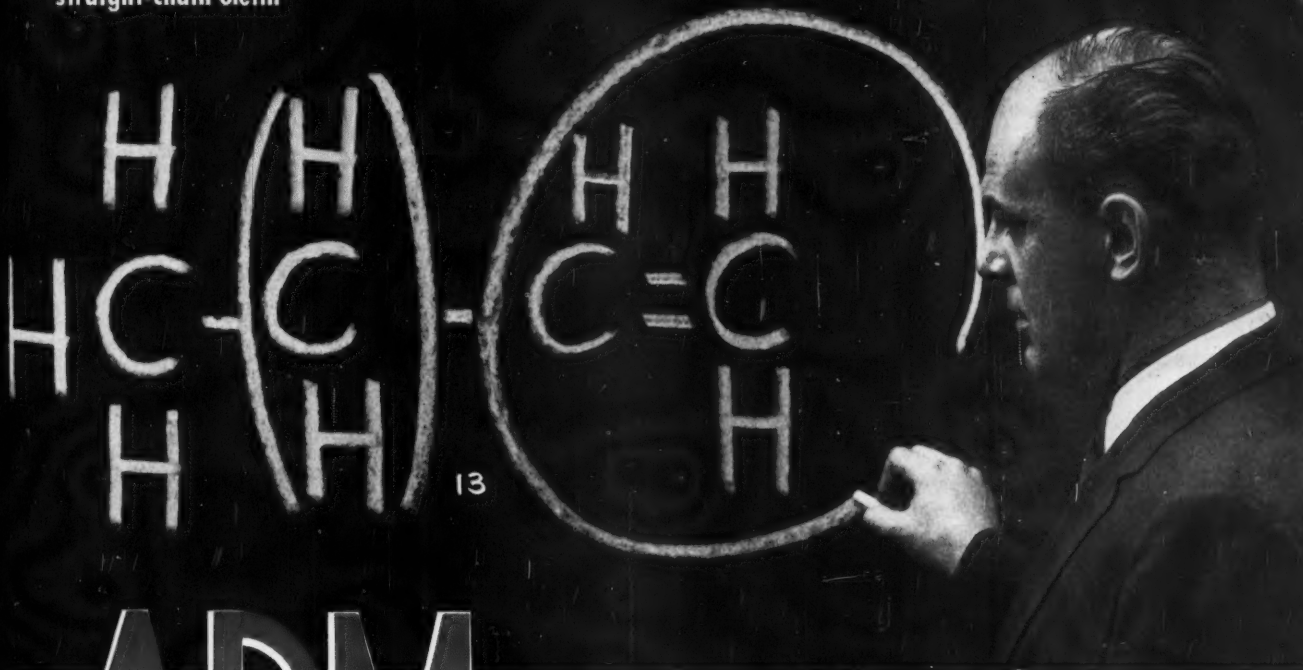
Although this production rate is still far behind the U.S.'s 5.4 billion lbs./year or more (*CW Market Newsletter*, Oct. 10), Cruse insists there is no room for complacency and cites Russia's plant building program—257 new plastics and/or textile plants in seven years.

SELECTED PRICE CHANGES—WEEK ENDING OCTOBER 19, 1959

	Change	New Price
UP		
Lauric acid, tanks	\$0.01	\$0.37
Myristic acid, tanks	0.015	0.32
Linseed oil acid, dist., dms.	0.005	0.20
Peanut oil, crude, tanks	0.005	0.1225

All prices per pound unless quantity is quoted.

Adecene A-51
straight-chain olefin



ADM slashes α -olefin prices 30%

ADM has cut the price of fatty alpha olefins in a sweeping move to offer alpha olefin advantages for dozens of untapped uses. This means you can now dust off promising research projects which the high cost of alpha derivatives previously made you shelve. Increasing use by the chemical industry enables us to drop the price of plentiful ADM Adecene A-51 as much as 30 per cent, depending upon your volume.

Adecene A-51, derived from readily obtainable natural fats and oils, can be supplied by ADM in any quantity. It is a straight-chain alpha olefin in the C_{12} to C_{20} range with approximately 40 per cent C_{16} and 30 per cent C_{18} .

Adecene *alpha* olefins have structural superiority over the branched chain and isomerized varieties, and their chemical behavior is vastly different. Lack of steric hindrance from side chains allows the slender, straight-chain molecules to react with nearly theoretical results.

Because the Adevenes are prepared through the dehydration of high purity fatty alcohols under precisely controlled conditions, they show none of the unpredictability of isomerized mixtures made from polymerization or cracking. Adecene A-51, for example, is more than 90 per cent alpha olefins—with the unsaturation between the 1 and 2 carbon atoms. The alpha olefin content of the Adevenes is consistently uniform from one lot to another.

Combine the unique metal wetting qualities of the fatty aliphatics and the highly reactive alpha olefin form to create unusual new lubricant and fuel oil additives. The Adevenes readily form mal'ic or succinic adducts and polymers; and they link hungrily with numerous organic or inorganic combinations for a variety of tailor-made compounds.

So plan now to investigate or re-assess *your* position in regard to the astonishing properties of alpha olefins. Write today for data and research samples of Adecene A-51.

Now, consider ADECENE A-51 in chemical intermediates for ...

- ☐ Leather Treating ☐ Plastics ☐ Textile & Paper Chemicals
- ☐ Detergents ☐ Gasoline ☐ Protective Coatings & Adhesives
- ... to name just a few applications. Derivatives of Adecene alpha olefins are finding wide use in the chemical industry, especially as promising new lube and fuel oil additives.



Write for 52-page catalog on other aliphatic chemicals.


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The lid's off on better paint products!

"Technological progress which now permits, for the first time, 'tailoring' of epoxy plastic resins to specific needs promises to accelerate the growth of these previously limited plastic materials" — *The Journal of Commerce* (italics ours).

That statement was printed in December 1958. Thirty-one years earlier, in Detroit, Reichhold Chemicals, Inc., introduced *its first* unique synthetic resin. That resin was "tailored" for production of quick-drying automotive finishes, an important step forward in 1927.

Ever since that year, RCI has continually been a leader in providing important new developments and technical assistance to help America "lift the lid on better paint products."

As with other resins long favored by the surface coating manufacturer, RCI will "custom-make" epoxies to exacting requirements. RCI offers its EPOTUF epoxy resins as solids, liquids, or esters — and will also supply epoxy solids in any practical solution.

Reichhold makes hundreds of resins for surface coatings. Among other newer ones are isophthalic acid alkyds, melamine-formaldehydes, polyesters, and PVAc, acrylic and alkyd emulsions.

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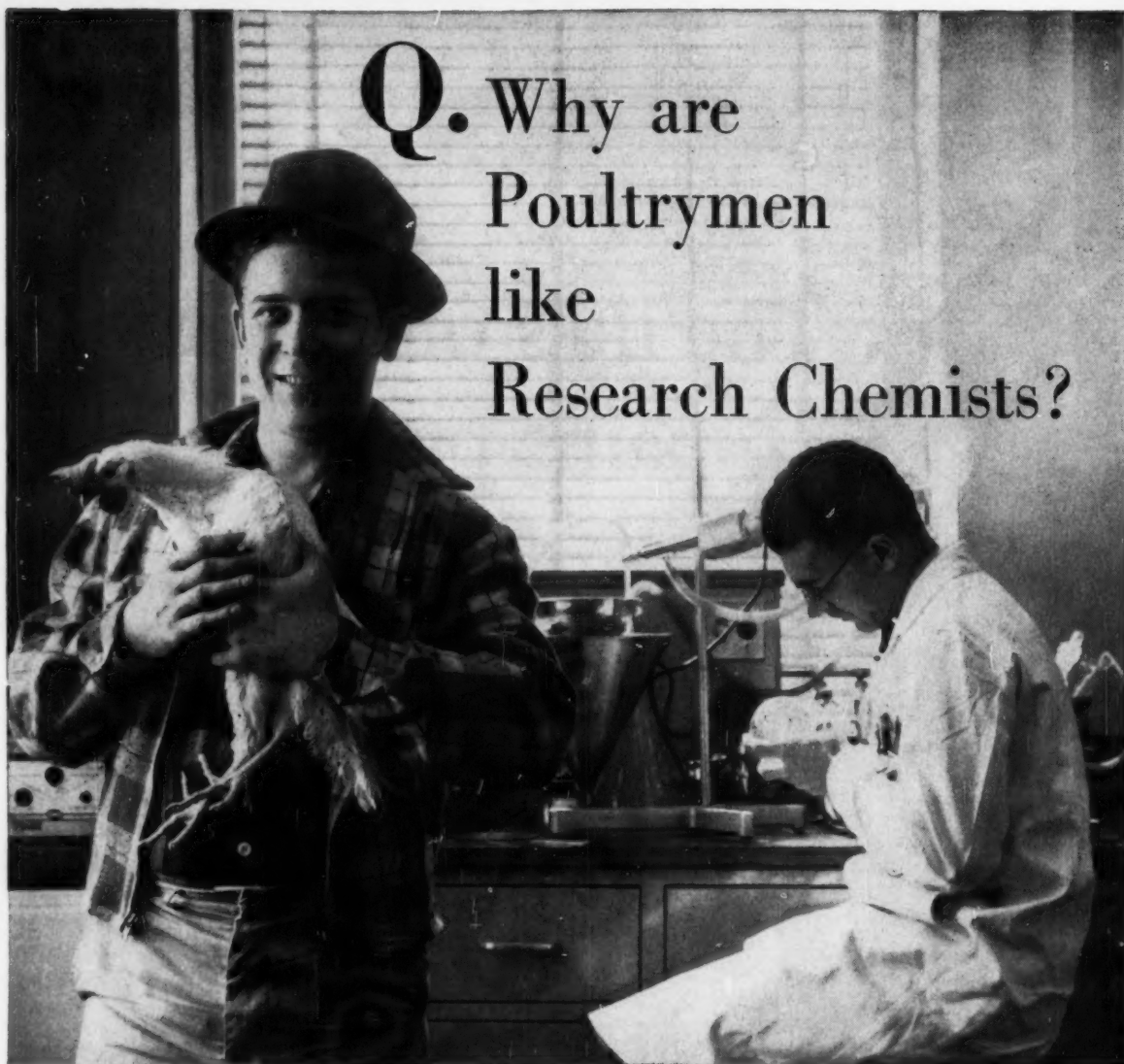
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MARKETS

Copper Chemicals: Enough for Export?

The continuing copper strike is further confusing the muddled copper chemicals picture. CW's industry check last week showed that most domestic users of copper chemicals are confident that supplies at current rates will be available for at least two months. Exporters, facing a demand upsurge comparable to the '58-early-'59 situation, are more hard pressed. For both, however, the extent of demand for farm use is the big puzzler.

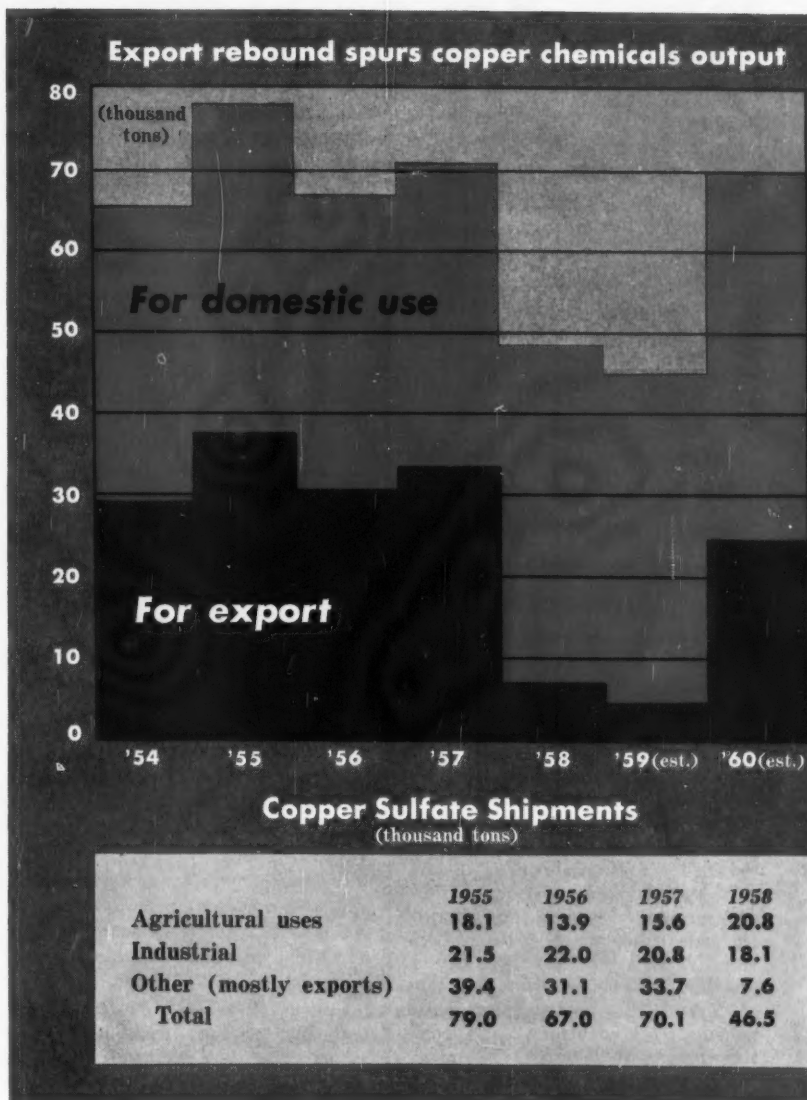
A first look at the supply situation is encouraging. Although one major producer of copper chemicals, Phelps-Dodge, is strikebound, two other important producers are not: Tennessee Corp. (Atlanta) has its own supplies. Republic Chemical Corp. (New York) relies heavily on readily available scrap copper.

Moreover, there is a considerable reserve of many compounds. Demand sagged during '58 and much of '59, and reserves were permitted to accumulate.

Full Tilt: Tennessee Corp. reports its copper and copper chemicals production is running full tilt, that it is able to meet all its normal orders, is even taking up some of the Phelps-Dodge slack. Although the supply situation is admittedly becoming tighter, there are assurances that buyers need not fear price profiteering; the only time copper chemicals tabs are increased, Tennessee says, is when major copper producers hike costs of base metal. Right now, copper chemicals pricing is based on a 31.5¢/lb. metal—although some custom smelters reportedly are quoting as high as 34.5¢/lb.

There's a similarly reassuring story from Republic Chemical—but for a somewhat different reason. Republic says it might now be in a tight situation if it had to rely solely on primary copper, but it employs an ammonia leaching process that strips copper from scrap (such as copper wire). The word from Republic, too; no price hikes in sight.

Distributors also report that copper chemicals stocks in general are good—will satisfy most needs for at least two months.



Biggest reported pinch is on large- and medium-size copper sulfate crystals (delivery time up to six weeks, says one seller), less critical on finer grades (delivery in about one week). Copper sulfate is, in any case, the vital factor in copper chemicals markets because it's sold in far greater volume than are other salts.

Banana Business Back: The uncertainty about demand colors the export picture, particularly. Two years ago, banana growers in South America were largely responsible for put-

ting the skid under copper sulfate markets. Now, their current plans underlie an expected big pickup of U.S. copper sulfate production next year (chart, above).

The pickup is a return to an earlier situation. Several years ago, South American fruit growers—mainly banana growers—bought roughly 3,000 tons/month of copper sulfate to use as fungicide. This market accounted for most of the 33,644 tons of sulfate exported in '57—a significant quantity, since it also represented almost

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MARKETS

half of the total U.S. copper sulfate output that year (70,780 tons).

Suddenly, the fruit growers switched to use of oil sprays, sent the U.S. copper sulfate export market into a tailspin; shipments of the chemical dropped to 7,247 tons in '58, and to 214 tons by the end of first-quarter '59.

But the export picture for the rest of '59 doesn't look so bad. Some copper marketers predict total exports will be around 5,000 tons for the year, since fruit growers are switching back to use of copper sulfate.

By next year, some copper sulfate sellers predict, the export market will bounce back to about 25,000 tons and boost total U.S. sulfate production to 70,000 tons.

These are somewhat uncertain estimates, however, as down-to-earth tonnage estimates on '60 copper sulfate demand in South America are not forthcoming from banana growers. They do admit, however, that substantial tonnages will be bought. Growers' researchers are still trying to settle the question of what pesticide to use—and that, say some chemical marketers, leaves the export picture still very much blurred.

Right now, however, banana growers are combing European sources for copper sulfate, are getting some from the U.S.—and are fretting considerably about the current copper strike because it complicates their purchasing. Should they return fully to use of copper compounds, total U.S. sulfate sales may rise to as much as 7,000 lbs./month — about 2,000-2,500 tons of which would go to export markets.

Upswing for U.S. Demands: Domestically, too, farm demand for copper chemicals has fluctuated sharply. U.S. agricultural use of copper sulfate dropped off significantly in '56 (see chart) but picked up somewhat in the following two years. One reason for the slump: Florida farmers were informed by the Florida department of agriculture that the state's soil was saturated with copper sulfate, that addition of more sulfate would be pointless. Word from the agricultural advisors now is that much of the excess sulfate has been absorbed; hence, copper sulfate marketers are anticipating a sizable increase in demand next year.

Increased demand for copper sul-

fate by municipal water works (for use in controlling algae, etc.) is also looked for. And an unexpected big call for the chemical is foreseen as a result of reappearance of the so-called "red tide," a heavy concentration of red microorganisms (*Gymnodinium brevis*), along a 100-mile stretch of waters off the Florida shores; fish are being killed by the thousands.

These developments in copper sulfate-consuming markets will help considerably to bolster the total business picture for '59. Sales during the first part of '59, says one marketer, were curtailed drastically—they totaled 3,500-4,000 tons/month, compared with "normal" sales of 6,000-7,000 tons/month. The export drop was, of course, a major factor in the cut-back.

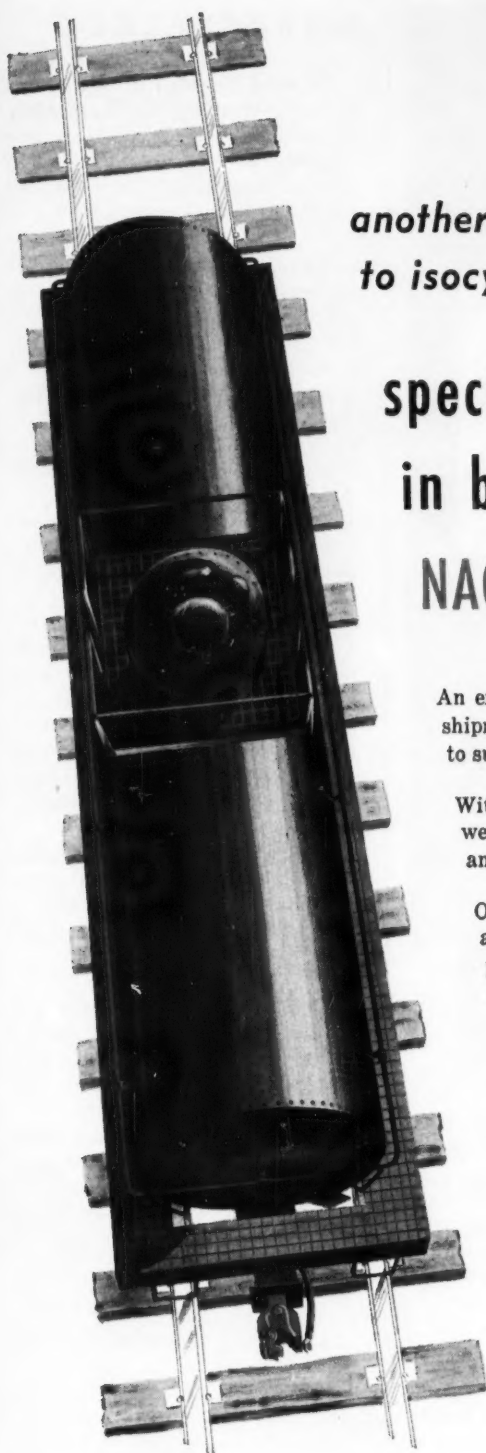
Stockpile Source? It's debatable how well the operating producers will be able to handle demands if the copper strike continues for many months. If calls for copper chemicals perk up as expected, there will undoubtedly be a greater need for more primary metal. One source would be the government stockpile—but it's moot whether these stocks would be tapped.

U.S. copper companies—backed up by congressmen from mining states—earlier this year kicked up a ruckus when the federal government hinted it might dispose of 128,900 tons of copper stockpiled under the Defense Production Act (*CW Market Newsletter*, April 25). Their efforts to block the release were successful.

Now, these congressmen reportedly would permit release of the metal only under two restrictions: (1) release during the strike only if a serious internal crisis develops; (2) release after the strike only if no more than 25,000 tons were moved (enough to get supply lines moving during the few weeks needed to get copper production back to normal pace).

Meanwhile, the Office of Civil & Defense Mobilization says it would require evidence that vital defense orders are jeopardized before it would consider tapping government reserves.

The big squeeze on primary copper metal stocks is bound to tighten the copper chemicals situation. What happens two months from now depends on how fast demand picks up, how long the strike lasts. In any case, the chance of a scramble for the chemicals in late '59 can't be ruled out.



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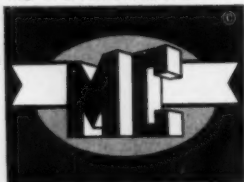
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MARKETPLACE

Prices of N-methyl pyrrole are cut across-the-board, up to 25%, by Ansul Chemical (Marinette, Wis.); now available in drum quantities, the chemical is used mostly as a stabilizer for chlorinated hydrocarbons.

A new distillate desulfurization unit (capacity: 8,000 bbls./day) is on-stream at British American Oil's refinery at Clarkson, Ont. The unit is designed to remove 90% of sulfur content in fluid catalytic cracking light-cycle oil, stove and diesel base. Hydrogen will be supplied from reformer gas; pelletized cobalt molybdenum catalyst is used.

Design and construction of the unit was handled by Canadian Kellogg Ltd.—Toronto subsidiary of M. W. Kellogg (New York).

Dimethylacetamide—a new polar solvent—is now produced in commercial quantities by Du Pont. It's similar to dimethylformamide but has a higher boiling point. Major expected uses: as polymer solvent, reaction catalyst and medium, crystallization solvent.

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Electronic-grade potassium silicate containing 35% solids (6% more than in other commercially available products) is now offered by Sylvania Electric Products (Towanda, Pa.).

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A new melamine-acrylic resin (Mel-aqua 600) for use in water-thinned industrial and automotive finishes is produced and marketed to paint makers by American Cyanamid.

Only pigment and water are added to the resin to produce a ready-to-spray enamel that excludes the use of solvents and driers—thus eliminating fire hazards, says the firm. Outdoor durability is claimed to be on a par with that of highest-quality melamine-alkyd finishes. Recommended baking schedule: 30 minutes at 300 F.



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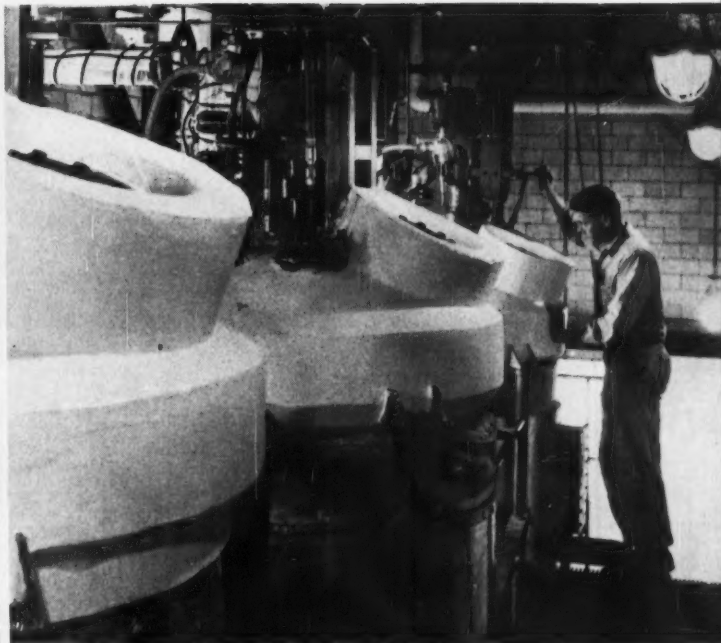
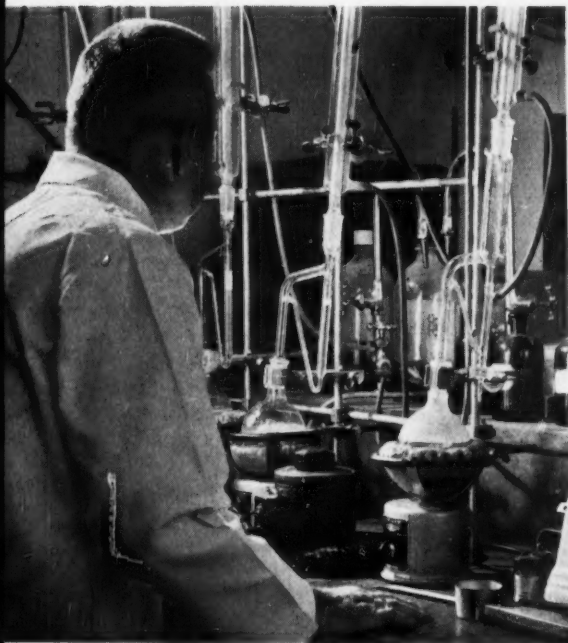
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'Don't Do It Yourself' Trend Gains in CPI

Custom chemicals production—a service whereby a chemical concern offers to custom-make a product to specifications—last week was developing rapidly as the latest trend in the trend-conscious chemical process industries. Broadly, it's a simple, business-bolstering move. But does it, as old-timers in customizing say, hold more pitfalls than profits? That's too early to tell; meantime, it's definitely bringing new selling ideas as well as competition.

For the first time, companies are actively seeking custom business through direct mail, space advertising and sales teams. Moreover, a number of CPI firms that never gave customizing a second thought are making a pitch for the business.

Many Reasons: Reasons given for the increased interest in custom chemical manufacturing are as many and varied as the companies spot-checked by *CW*.

W. T. Knight, field sales manager for American Cyanamid's Fine Chemicals Dept. (a surprising newcomer to customizing on a significant scale),

said, "The trend represents still another trend"—a move on the part of chemical and drugmakers toward specialization. "From the pharmaceutical industry's point of view, there's a tendency to get away from 'me-too' products. Everybody wants to be a specialty house. The emphasis is on the 'hot' items, the products that will have a big demand. When a firm comes up with one of these items, it must decide whether to build the facilities to produce it or have a customizing outfit make it. Nowadays, the nod seems to go to the customizers."

Eli Lilly & Co.—another surprising entry into customizing—sees its new enterprise as a way to broaden its product base by making better use of its technical know-how, facilities and personnel. Fred Randall, assistant merchandising director of Lilly's Agricultural and Industrial Products Division, says the firm uses market research in custom manufacturing. "We have market development teams on the road now, talking with a stratified sample of the CPI. We want to

define the customizing needs to be met, determine if what Lilly has to offer fits those needs, and if it's economically feasible for us to become involved. It could be that we will want to add new facilities, although our present equipment is versatile as a result of meeting pharmaceutical needs," Randall says.

Lilly's program—complete with market research, space advertising and direct mail—differs markedly from Cyanamid's. According to Knight, Cyanamid's interest in customizing resulted from salesmen's "pressure." The company did some custom work but did not push it. "But when some Cyanamid salesmen saw others getting this profitable business from time to time, they also asked for a free hand to solicit it," says Knight. "Now, it's our sales policy to encourage this business, particularly in the area of diuretics, tranquilizers and hypoglycemics and, broadly speaking, nitrogen chemistry."

Tight Money, Idle Equipment: Commercial Solvents Corp.—encouraging customizing business, as is Cyanamid,

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SALES

with a multicolored brochure—finds idle equipment and tight money at the root of the trend toward custom manufacturing. CSC's J. F. Dudley, vice-president, production and engineering, told *CW* that his firm's new program was set up because some CSC plants dealing largely in fermentation were not operating at capacity. This was due in part, he said, to technological changes in the production of butyl alcohols and acetone, no longer produced by fermentation. "We wanted to find work for the equipment that wasn't being used full time," he added.

As for the industry-wide trend, Dudley pinpointed inadequate depreciation allowances for tax purposes and tight money as contributing factors: "These are likely to discourage companies from buying new facilities to produce a new item. Instead they turn to other, more versatile firms, or to firms with experience in producing a related item, to get the item produced to their specifications. This is customizing."

Profit Motive: A somewhat similar reason was advanced by Koppers Co.'s Gordon Gilbert, sales manager, chemical sales department of the Chemical and Dyestuffs Division. That division, created by the Koppers reorganization last year, is responsible for the firm's customizing effort.

According to Gilbert, "Customizing is industry-wide because any chemical company large enough and versatile enough to handle custom manufacturing is glad to get business during these days of the profit squeeze. The need for this service on a large scale has existed for some time. Now it's being met by larger companies casting about for every way to increase profits and reduce costs."

Koppers' current customizing effort stemmed from the acquisition in '55 of American Aniline Products Co., which brought into Koppers' setup dyestuffs know-how, manufacturing versatility and a wide range of processes and equipment. Shortly after American Aniline was acquired, Gilbert was assigned to investigate the firm's Lockhaven, Pa., plant to determine its potentialities as an intermediates producer and define specifications and markets. Custom production in earnest evolved from this, and now Koppers is actively advertising and promoting its new service.

More Views: Increasing sales and

product competition, technological progress and product obsolescence gained votes as contributors to the trend toward customizing from three CPI firms long active in that business—Distillation Products Industries Division of Eastman Kodak Co., Merck & Co. and Maumee Chemical Co.

Increasing competition and the need for companies to find new compounds that will lower costs or win competitive advantages were cited by James Fuess, manager of Distillation Products' Eastman Organic Chemicals Dept., and by Maumee's Louis Loutrel, Jr., sales vice-president. Loutrel's company regards customizing as "an excellent way to build business for diversified equipment." (He also said it's hard to see "why some big companies want in—this is a business for small companies that are able to move fast on special projects.")

Loutrel went along with a Merck spokesman in listing product obsolescence as a factor. They agreed that companies are reluctant to pour large sums into new facilities to produce new items when they know that the new items will be made obsolete in a short while. "The average shelf-life of new drugs used to be 10 years, now it's more like two," one observer commented.

Unpleasant Surprises? Loutrel prophesies that some newcomers to customizing will be in for unpleasant surprises. "There are many disadvantages," he says. "For example, the customer's product may fail and his initial order for tailor-made items may not even cover the supplier's research expenses. Moreover, some firms may have five or six custom manufacturers working on a product without any one knowing about the others. The customer might decide to start doing his own production, or he might overstate the potential of his product. And pricing is always a problem."


Still, Maumee, which gets almost half of its sales volume from the highly secretive customizing business, continues plugging for more orders, relying chiefly on direct-mail pieces featuring the firm's cartoon character, "Iso Stitchintime," the chemical tailor.

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SALES

experienced management backs up. Sales Coordinator William Thawley's warning: "Customizing is a tricky business."

Says Thawley, "There are many risks involved. You can't be sure of the demand for custom chemicals and less than one out of 10 is put into substantial production. Not only that, the 'processes' submitted by the customer often are incomplete, or are only in the test-tube stage. He expects you to bring it up to commercial-scale production. But if you're going into the business, you must have the research facilities available and be ready on short notice. You must have integrity and you can't be in it just to make use of idled equipment at your convenience."

Penick's customizing business makes up a minor portion of its over-all business, and its dollar volume is down this year, although the number of custom jobs is up. This is due, Thawley says, to increased competition: "Prospective customers shop around."

One other big reason for more firms' trying customizing, according to Penick President S. B. Penick, Jr., is curiosity: "The newcomers want to be sure they're not missing out on a profitable thing."

Despite the hazards of customizing, as voiced by the firms long in the business, more CPI companies are making a serious try at it. Their success at this will depend largely on the sales team—and for many salesmen, the new services are unfamiliar ones, call for new approaches.

They'll have to show the advantages of sending work out, demonstrate how custom work offers flexibility, speeds new products to the marketplace. And they'll have to do this in the face of sharper competition. It's shaping into a real battle.

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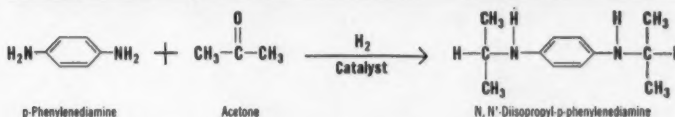
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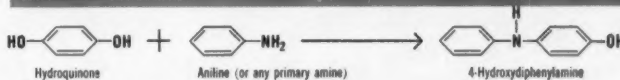
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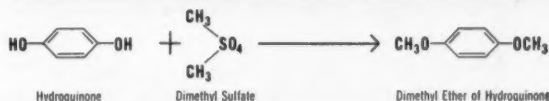
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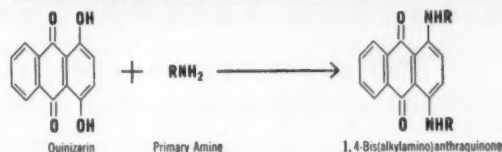
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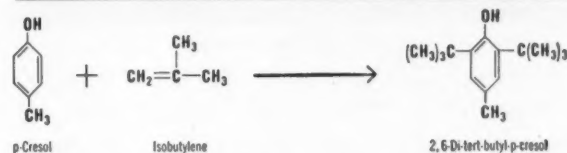
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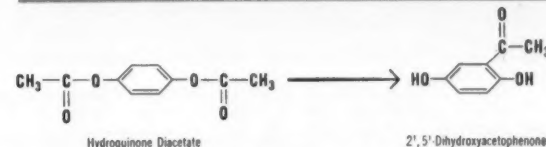
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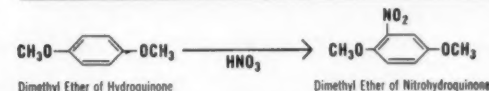
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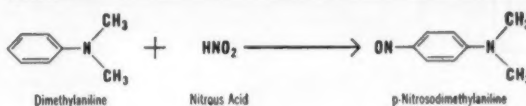
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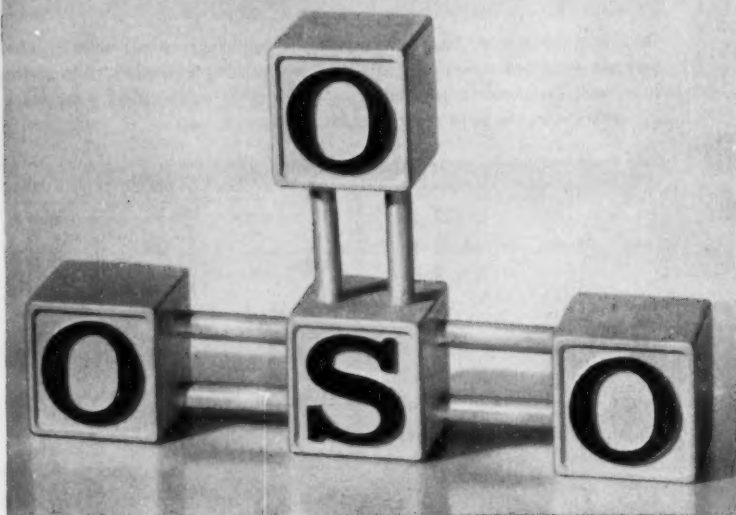
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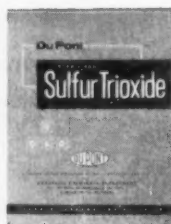
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• **Cosmetic Bases:** Folder outlines specifications of Alcolans, a series of emollient, water-oil emulsifiers. Typical formulations for cosmetic hair oils, creams and hand lotions included. Robinson, Wagner Co., Inc. (Mamaroneck, N.Y.).

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OPINION

Addendum on Penta

TO THE EDITOR: With reference to your excellent article on pentaerythritol (*CW*, Aug. 29, p. 117), we would inform you that Heyden Newport Chemical Corp.'s interest in St. Maurice Chemicals Ltd. was acquired by Shawinigan in April '58, and this company now operates as a division of Shawinigan Chemicals Ltd.

H. S. SUTHERLAND
President
Shawinigan Chemicals Ltd.
Montreal

Businessmen in Politics

TO THE EDITOR: Although my respect for civic leader Charles P. Taft cannot be upset by one opinion, some of his comments regarding businessmen in politics (*CW*, Sept. 12, p. 10) startle me. . . .

His remarks about narrow purposes, and his points 1, 2 and 3 are true and make good sense. However, to me at least, he errs in point 4, in which he states "... starting in the precincts . . . is eyewash, because intelligent young businessmen are the last thing the local machine wants . . ." They may not want them, but if "intelligent young businessmen" will become politically active in an efficient, businesslike manner at the precinct level, the machine will find it *does* have them, like it or not. It is well known that most elections for political positions at the precinct level are dull and noncompetitive; in many cases, several write-in votes in a primary are enough to secure the job. In fact, is not this apathy the largest single mistake made by the great majority of eligible voters?

This point is directly related to Mr. Taft's statement that "every good American ought to be in politics." Certainly the phrase "every American" includes businessmen, and their rights are just as important to protect as those of the union man, the grocer or the farmer.

It seems a natural conclusion then that any program by business to encourage their employees to get into politics to protect their rights—whether in combating a detrimental opinion or encouraging a good civic project—is not only to be condoned but is also a very definite responsi-

VIEWPOINT

Needed: More of the Same

THE DATA ON ORGANIC CHEMICAL PRODUCTION collected by the U.S. Tariff Commission over the past 40 years really shouldn't have been collected at all. For it now appears that neither Congress nor any executive agency formally authorized collection of these statistics. The only request on which the statistical program is based was a plea from President Woodrow Wilson in 1919 for data on the dyestuffs industry, a request that wasn't repeated.

While we find it hard to condone the action of those who took it upon themselves to conduct the second year's study, there is no question that the project, now in its 41st year, has proved its value. The figures are valuable, and they are heavily relied on by the chemical industry. It's a complex job that has been done well.

Thus, Tariff Commission Chairman Joseph Talbot's plan to seek a specific mandate to continue gathering and publishing these statistics is one that merits substantial support from the chemical industry. If the mandate he seeks is in the form of a Congressional authorization, it's one that industry should push.

But the question of specifically authorizing publication of organic chemical statistics naturally brings up a perennial poser: Why are production and sales data on individual chemicals collected by so many different government agencies? There are five sources of government statistics on individual chemicals—the Tariff Commission, for organics; the Census Bureau, for inorganics and for fats and oils; the Bureau of Mines, for the mineral industries; USDA's Bureau of Agricultural Economics, for naval stores; and the Tennessee Valley Authority, for its fertilizer production.

This question, as it concerns the broad field of government statistics, was studied by the Hoover Commission's task force on government statistical agencies. The task force recognized that collection of some statistics requires highly specialized knowledge of subject matter.

Organic chemical statistics would certainly fall under this highly specialized statistical category. But is there still too much compartmentalization of interrelated statistics?

Now that the subject has been broached, aren't there other questions that should be answered? A major one: How can the collection and publication of chemical statistics be speeded? And aren't there a number of chemicals on which data should be published monthly (instead of annually)?

We submit this is a worthwhile subject for a Chemical Market Research Assn. or Manufacturing Chemists' Assn. committee to study.



Editor-in-Chief

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OPINION

bility. The fact that management has notoriously neglected this duty does not mean a political program is now out of order. Instead, it calls for a faster, tougher pace if management is to catch up with other groups.

Mr. Taft states that "what is really self-interest, however justifiable, ought not to be blown up into civic spirit," and that "every good American ought to be in politics, because through politics his government is run in a way that provides justice for his rights."

Only voters can sit in judgment to differentiate between "self-interest" and "rights." And only when business explains its self-interest as the interest and right of the community will it have done its political job.

May I . . . urge "every young American businessman" to get into politics and sell his product.

N. D. JONES

R. D. 3

Oswego, N. Y.

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Atomic Industrial Forum, annual meeting, Sheraton-Park Hotel, Washington, D.C., Nov. 2-4.

Canadian Manufacturers of Chemical Specialties Assn., annual meeting and convention, Royal York Hotel, Toronto, Nov. 2-4.

American Institute of Mining, Metallurgical and Petroleum Engineers and Institute of Metals, fall meeting; subject: nuclear metals; Morrison Hotel, Chicago, Nov. 2-5.

Technical Assn. of the Pulp and Paper Industry, 13th alkaline pulping conference, Robert Meyer Hotel, Jacksonville, Fla., Nov. 4-6.

American Nuclear Society, meeting, Sheraton-Park Hotel, Washington, D.C., Nov. 4-6.

Industrial Management Society, industrial engineering and management clinic, Sherman Hotel, Chicago, Nov. 4-6.

Louisiana Polytechnic Institute, instrumentation conference, Louisiana Polytechnic Institute, Ruston, La., Nov. 5-6.

Glass Containers Manufacturers Institute, semiannual meeting, Arizona Biltmore Hotel, Phoenix, Ariz., Nov. 9-12.

Armour Research Foundation, national industrial research conference, Sherman Hotel, Chicago, Nov. 12-13.

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New Patents, Processes, Products Wanted. Well financed industrial firm will buy outright, or develop and market on royalty basis. We are particularly interested in patented ideas in the chemical or packaging fields. If the item is not patented, disclosure will be received only on a non-confidential basis. Your written reply will receive most careful consideration. M. M. Fisher Associates, Dept. H, 79 West Monroe Street, Chicago 3, Illinois.

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\$3,000,000 Liquidation—Chemical Plant at Orange, Texas. Type 316 Stainless Steel Tanks, Kettles, Heat Exchangers, Columns, Stills, Crystallizers, Centrifugals, Pumps, Valves, etc. Wonderful Values. Send for list. Perry Equipment Corp., 1415 N. 6th St., Philadelphia 22, Pa.

Tolhurst 32" Suspended Centrifuge, Model 48 Stainless Type 316. Fract'g. Column, 78"—36 plate, w. reboller, condenser. Solvent Vapor Recov'y. Equip., Stainless Adsorbors, Tanks, Process Equip. Sales Corp., 4205 Fullerton, Detroit 38, Mich.

Phthalic Anhydride (Crude) 1 Million Pounds Available. If you have stainless or wooden extraction and filtering equipment, we can supply over 2,000,000 lbs. of 90% Phthalic Anhydride. You can purchase crude or extract and resell Phthalic Acid to us. FS-2899, Chemical Week.

Struthers Wells 530 sq. ft. 7316 Stainless steel evaporator. Perry Equipment Corporation, 1415 N. Sixth Street, Philadelphia 22, Pa.

1—10' diameter x 230' long Rotary Kiln, 3/4" shell. Perry Equipment Corp., 1415 N. Sixth Street, Philadelphia 22, Pa.

CHEMICALS WANTED

Surplus Wanted—Chemicals, Pharmaceuticals, Oils, Acids Plasticizers, Resins, Dyes, Solvents Pigments Etc. Chemical Service Corporation, 96-02 Beaver Street, New York 5, N. Y. HANover 2-6970.

FOR RENT

Fully equipped liquid storage plant. Gravity feed from railroad siding to 3 tanks with a capacity of 25,000 gallons each tank. Can handle any type liquid up to 140 Octane. Double loading rack. Also facilities for storing cans and drums and warehousing. Unrestricted. Queens Village, L.I., N.Y. SP. 6-2230.

MISCELLANEOUS

To Employers Who Advertise for Men: The letters you receive in answer to your advertisements are submitted by each of the applicants with the hope of securing the position offered. When there are many applicants it frequently happens that the only letters acknowledged are those of promising candidates. (Others do not receive the slightest indication that their letters have even been received, much less given any consideration.) These men often become discouraged, will not respond to future advertisements and sometimes even question if they are bona fide. We can guarantee that Every Advertisement Printed Is Duly Authorized. Now won't you help keep our readers interested in this advertising by acknowledging every application received, even if you only return the letters of unsuccessful applicants to them marked say, "Position filled, thank you." If you don't care to reveal your identity, mail them in plain envelopes. We suggest this in a spirit of helpful co-operation between employers and the men replying to Positions Vacant advertisements. Classified Advertising Division, McGraw-Hill Publishing Company, "Put Yourself in the Place of the Other Fellow."

'59 OUTPUT INDEX

1958

'59 PRICE INDEX

1958

OCTOBER 24, 1959

WEEKLY BUSINESS INDICATORS

Chemical Week output index (1947-1949=100)
Chemical Week wholesale price index (1947=100)
Stock price index (12 firms, Standard & Poor's)
Steel ingot output (thousand tons)
Electric power (million kilowatt-hours)
Crude oil and condensate (daily av., thousand bbls.)

	<i>Latest Week</i>	<i>Preceding Week</i>	<i>Year Ago</i>
Chemical Week output index (1947-1949=100)	210.0	210.8	190.0
Chemical Week wholesale price index (1947=100)	111.5	110.9	111.0
Stock price index (12 firms, Standard & Poor's)	57.87	58.12	46.12
Steel ingot output (thousand tons)	365	362	2,003
Electric power (million kilowatt-hours)	13,086	13,234	12,067
Crude oil and condensate (daily av., thousand bbls.)	6,812	6,825	6,874

TRADE INDICATORS
(million dollars)

All manufacturing
Chemicals and allied products
Petroleum and coal products
Paper and allied products
Textile products

Manufacturers' Sales

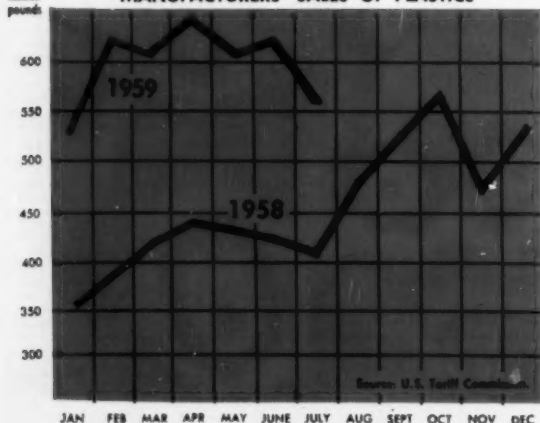
	<i>Latest Month</i>	<i>Preceding Month</i>	<i>Year Ago</i>
All manufacturing	\$29,252	\$30,858	\$26,388
Chemicals and allied products	2,131	2,171	2,003
Petroleum and coal products	3,070	3,093	2,787
Paper and allied products	1,025	1,060	941
Textile products	1,256	1,256	1,077

Manufacturers' Inventories

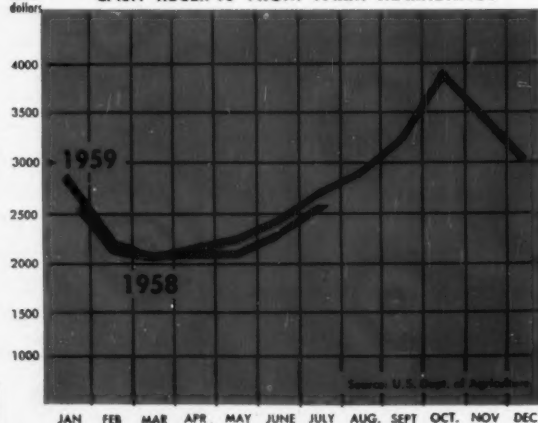
	<i>Latest Month</i>	<i>Preceding Month</i>	<i>Year Ago</i>
All manufacturing	\$52,049	\$52,241	\$49,425
Chemicals and allied products	3,896	3,847	3,734
Petroleum and coal products	3,308	3,314	3,274
Paper and allied products	1,493	1,457	1,418
Textile products	2,494	2,534	2,524

CHEMICAL CUSTOMERS CLOSE-UP

MANUFACTURERS' SALES OF PLASTICS



CASH RECEIPTS FROM FARM MARKETINGS



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anti-skinning
and improved
drying properties
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You can upgrade your alkyd surface coatings to get improvements in both reduced skinning and faster drying through the use of PANAREZ 6-210 Hydrocarbon Resin. You save on inventory of costly anti-skinning agents; you obtain measurable product improvement at low cost. You also get better gloss at lower cost with PANAREZ 6-210 Resin.

To add these product qualities to your alkyd paints, call for assistance from your Amoco sales representative. Experienced alkyd men in Amoco's technical service laboratory will work with you on the use of PANAREZ 6-210 Resin to help you get the properties you want for your finished products. Your inquiry will receive immediate attention.



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